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# THE ARCHITECTURAL REVIEW

*A Magazine of Architecture & Decoration*



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June 1933

No. 439

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### CELTIC MASONRY

This view of Polperro shows a typical extent of Cornish wall. Bricks in Cornwall are rare and the pointing of other material, be it slate or granite, almost equally so. Most Cornish walls are built of rubble masonry in a primitive fashion. Slate is the predominant material used for hedges and house walls alike, the only difference in construction being that in hedges the slabs are laid vertically, in houses, horizontally. In the latter the whole house, roof, walls and slate-hung sides are given a coating of limewash and mortar, so that in the course of half a century the exterior gains a feathered silvery effect, much like that seen on the outside of mediaeval stained glass windows.

It should be noted that this picture, though it depicts tumbledown houses over an open drain, is not to be considered a slum. Polperro is now a great artistic centre.

PLATE i

June 1933

# Can We Save Central London?

By ROBERT BYRON

THE boorish opportunism of that tribe known as public men has seldom been more extravagantly displayed than when, Regent Street having been destroyed, no measures were taken to prevent a repetition of the disaster. Amiable gentlemen, said to be interested in the arts, voiced polite regrets. But not one of them, not one, even, of our countless hereditary legislators, found it worth while to carry his grief to the length of a parliamentary Bill. Their cry was to abandon hope. And hope remained abandoned until such time as the vandals of Crown Lands, having recently assisted in the deformation of Trafalgar Square, cast their eyes on Carlton House Terrace. From that moment it was clear that the architectural gangsters by whom London has so long been ruled had overreached themselves. Thanks to this flagrant assault on the amenities of the capital, and to the clandestine manner of its inception, public interest was at length aroused. *The Times* awoke. Cerberus, in the person of Mr. J. C. Squire, barked. And Major Elliot was finally constrained to admit that a mistake had been made and to express a pious intention of preventing its repetition.

Since then, as though to point the urgency of London's plight, another outrage has been committed on the wretched town in the shape of Faraday House, the new Post Office International Telephone Exchange. This building, though of some merit in itself, has been permitted, in despite of the ordinary L.C.C. regulations, to reach such a height as to obscure the whole drum of St. Paul's dome from certain points on the south side of the river near Blackfriars Bridge. From Hungerford Bridge and thereabouts, whence it used to be possible to view the essential points of Wren's London still teeming on the north curve of the Thames, the vision of St. Paul's dome, reigning over one of the grandest urban prospects in Europe, has already been spoiled by the naked hinder parts of Unilever House. The work of destruction has now been completed, as usual under Government auspices, from further down as well. There is no redress; there never will be any. But let us repeat, and repeat again till the public is nauseated with our iteration, that the time has come either to save what still remains of the capital, or to surrender, for good and all, the privilege of possessing, in architectural terms, any capital at all.

Parliament, for one moment, was roused over Carlton House Terrace, despite Mr. Maxton's grunts about the homes of the rich. Whether the temper shown was but a flash in the pan or significant of a lasting resolve, is impossible for any one outside that august body to determine. But if more is to be heard of saving London, it may be allowed to suggest certain main objects which any parliamentary Bill, to be effective, must achieve. The opportunity will not come again. For it is hardly conceivable that Providence will again vouchsafe another such an architectural outrage as that which drove St. Stephen's and Parnassus into their recent alliance.

The problems which confront the framers of a Bill for the architectural salvation of London are two: First, how to ensure that Carlton House Terrace and monuments of the same calibre shall be preserved; and second, how to regulate future development on lines suited to the dignity and convenience of an imperial capital.

It has been widely suggested that these problems might be solved if the Town and Country Planning Act, which

came into force on April 1, were so amended as to be made compulsory in the London area; and if the control of the Crown Lands were at the same time transferred from the Ministry of Agriculture and Fisheries, and from the whims of a secretive Commissioner, to the care of the Office of Works. This, no doubt, would be the easiest course. But the objections to it are fundamental. In the event of its adoption, the opportunity that has arisen will have been lost.

The Act, as it stands, is not a command, nor even an exhortation, to be good, but merely a licence. Before the responsible Minister can take action—no matter how great the disaster that threatens—the initiative must come from the local authorities and a planning scheme be presented by them. Then, if he approves the scheme, the Minister can enforce it in face of local opposition, provided always that time can be found to get it through Parliament. If, therefore, the Act were so amended as to make the production of planning schemes compulsory instead of voluntary in the London area, the separate borough councils, though to some extent controlled by the London County Council, would inevitably find themselves in conflict over an area which cries out for the enforcement of a single code regulated by a single authority. Furthermore, the transference of the Crown Lands to the Office of Works, though it would not increase, would in no way diminish the multiplicity of authorities responsible for the pattern and appearance of the London streets. Finally, perhaps the gravest objection to the proposed course is that the question of taste and of an æsthetic veto would be consigned in perpetuity to the limbo where it now rests.

At the same time, so large is the area of London and so diverse its character that some distinction must be drawn between the outlying residential districts and that central core which constitutes, in the eyes of the inhabitants and of visitors alike, the capital proper. To apply the same code to both would be unwise. For though both are concerned with planning, æsthetically the requirements of the centre deserve more consideration than those of the suburbs. In actual practice, respect for æsthetic considerations varies inversely with the rent-value of the land, and, therefore, with the land's proximity to the centre of the capital. It is precisely this practice which it should be the main object of any parliamentary Bill to abolish.

The first necessity of such a Bill, therefore, is to define the two areas, Central and Outer London. Moving clockwise, the mind's eye can imagine a rough delimitation of the central area, based on the river and following a semi-circle through Chelsea, Kensington Palace, Lord's, Gray's Inn Road and Liverpool Street Station, to the Tower. This area having been defined as that in which, speaking broadly, a large proportion of the English-speaking world has a personal stake, the suburbs might reasonably be consigned to the mercies of the existing Act, so long as it was amended to make planning compulsory throughout the county of London. Central London could then be dealt with by itself. For this purpose, certain broad principles should be clearly enunciated, the chief being that which should raise all questions of planning or building within the area from the level of local to national importance. Once it was understood that this principle would be observed and that commercial exploitation of ground rents



would not in future be allowed to stand in the way of it, the assistance, rather than the obstruction, of property owners might be expected. But this expectation could only be realized on condition that the Crown Lands were subject to the same principles as the rest of the area, instead of exhibiting, as they do at present, an example of competitive and avaricious vandalism for all to follow. Unified control of the area, therefore, in regard to planning and building must be a prime essential of any new Bill. In what body, existent or non-existent, this control should be vested, remains for those who draft the Bill and have knowledge of the existing machinery, to decide.

Once established, the first work of a controlling body in Central London must again be one of definition. Three schedules are immediately needed before the administration of the area can be conducted on coherent lines. These should include: first, such planning of streets, spaces, trees, and vistas as is already good and deserves to be maintained, whatever the fate of the adjoining buildings; second, such planning as is already bad and deserves to be swept away at the first opportunity on the grounds either of public inconvenience or of thwarting the realization of a larger scheme; and third, such of the existing buildings in the area as may justly be called national monuments and deserve, save in very exceptional cases, public protection. The latter category, in view of the dangers of the moment, is the most important. It would include Carlton House Terrace and the rest of Nash's London. The definition of a national monument may be justified on the ground either of aesthetic merit or of association. In either case, as a product of the national genius or as a memorial to some event in the national history, a building may be in fact—though not in law—to some extent national property. It is this proprietary interest that must be defended. A picture of national importance may go abroad, but it still exists. A building of national importance either remains where it is or is destroyed. The absurdity of the present situation is illustrated by the latest report of the Royal Commission on the Ancient and Historical Monuments and Constructions of England. Here, while Carlton House Terrace is being obliterated in front of his very windows, the King's Most Excellent Majesty is begged to take cognizance of 93 monuments and constructions in East Herefordshire, the first of which is described as "a roughly oval mound," while the last is "an almost complete fourteenth-century house" known as Thing Hill Grange. The great period of English architecture was the eighteenth century. After the year 1714, the powers of King and Commission to take cognizance of anything, even earthworks, stop. Thus, while the whole of England is now sprinkled with neolithic boulders, Roman *valla*, and Anglo-Saxon pig-stys which have been officially proclaimed as invaluable to our national heritage, the monuments of London, unless they happen to be Gothic or timbered, may vanish from the earth without so much as an official sigh. It is not merely Carlton House Terrace, but the whole of London surviving from before the year 1850 which cries, if not for rigid protection, at least for its case to be considered before the gangsters are upon it.

At this point in the proceedings an obvious danger threatens, which is that, of the three schedules here outlined, the first and third might tend, if too rigidly employed, both to obstruct the second and to render the whole area architecturally moribund. We do not want our capital to have the air of a museum. It must express the present life of the nation no less than the past. Talent must continue to be employed on it. Novelty must not be taboo simply because it is novelty. Towns like Bath or Oxford may well be allowed to preserve their architectural character unchanged, as monuments to an intimate cultural tradition. But London must change as the world changes, must always

be subject to extra-national influences and demands. This organic process is the life of London. It may be delivered from the barefaced exploitation of site-values which has hitherto controlled its action, but it must on no account be interrupted.

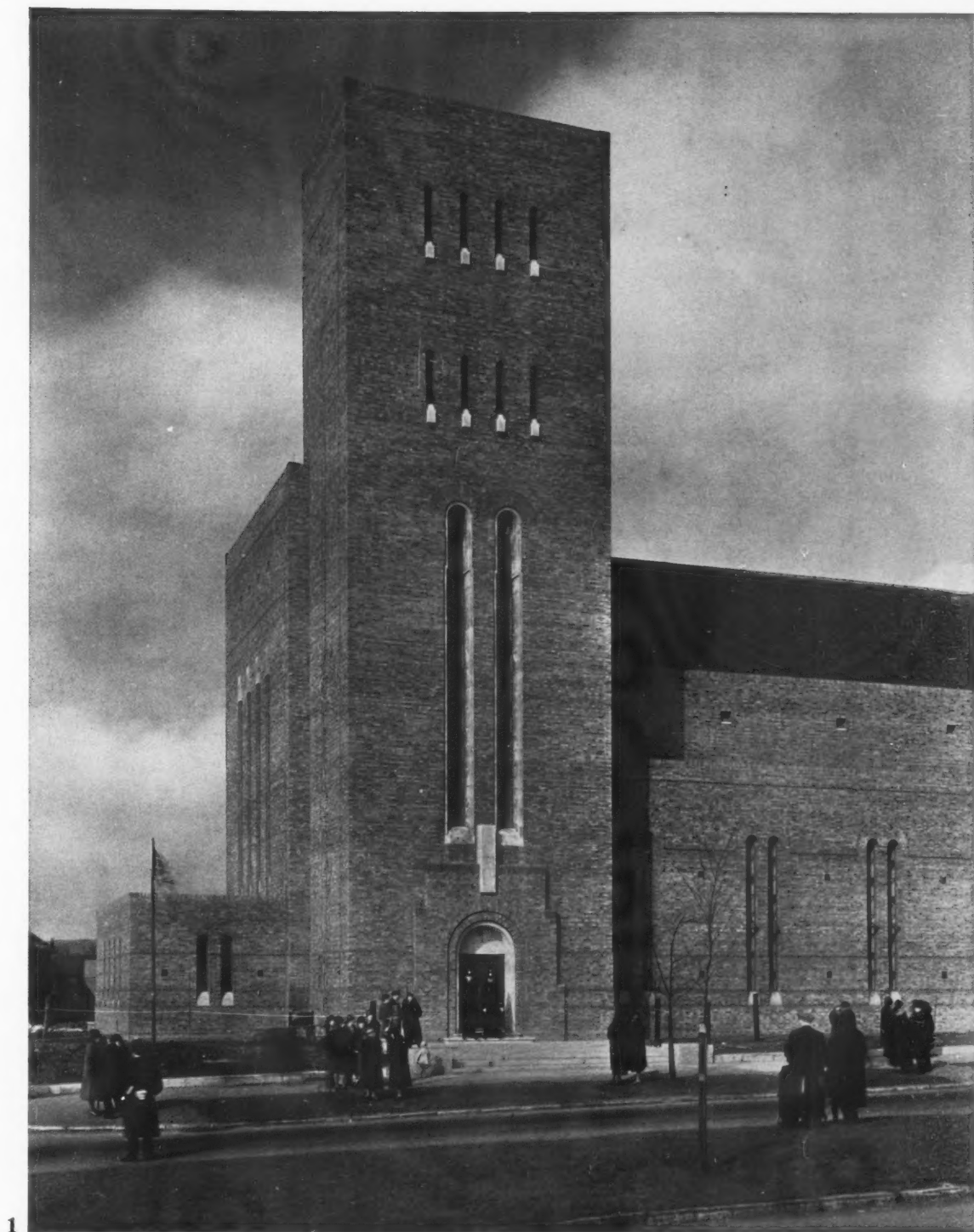
To obviate this danger, the operation of the schedules, and particularly of schedule three, should be guided by certain established principles. Only in very rare cases should any monument be classified as perpetually indestructible. Westminster Abbey presents such a case. Carlton House Terrace most emphatically does not. The fault of the Commissioners of Crown Lands lies not so much in the proposed demolition as in their way of setting about it. If the destruction of any building scheduled as "worthy of preservation"—a phrase which implies the permission of circumstances—be mooted, a case should be brought to show either that the building in question has become a cause of demonstrable inconvenience or that it threatens to obstruct a scheme whose beauty or convenience (but not necessarily profit) will eventually prove the greater asset. Any such case should be laid not only before the controlling body, but before the public at large, and full time should be given for a discussion of its merits. It should be strengthened or weakened, moreover, in proportion as the new design may seem aesthetically superior or inferior to the old. Then, if the case be held to have been proved, and if the new design be not superior to the old, care should be taken that it possesses a dignity adequate to the importance of the site, and that it does not conflict with the surrounding amenities whenever such conflict can reasonably be avoided. Admirable as Nash's Carlton House Terrace is, a finer is not unimaginable. If the existing buildings are really a source of public inconvenience, and if anyone can be found to produce a more gallant conception, by all means let that conception be erected. Meanwhile, Sir Reginald Blomfield's main design appears to have been consigned to the waste-paper basket; but the Terrace, as it stands, has been ruined for good.

And now comes a final and most important question—that of an aesthetic veto, without which no measure can ever be effective. There is no need to refer again to the abortive activities of the Royal Fine Arts Commission as at present constituted. An advisory body is useless; its advice is cynically disregarded. The body which controls planning and elevations in Central London, according to the scheme here postulated, must have a power of yes or no; and it must consist of men, or delegate its aesthetic functions to men, who are competent to exercise such a power. The existing personnel of the Fine Arts Commission might serve for this purpose, but for its inclusion of professional architects whose own works are liable to come up for judgment. The recent controversy between Lord Crawford and Sir Reginald Blomfield revealed the dangers of this situation. But however the juristic body may be constituted, its powers, subject to certain principles, should be absolute. The prospect is not a pleasant one. One can hear already the furious protests against "official architecture" which must inevitably resound, even though the judges be drawn entirely from the ranks of enlightened amateurs. But this is the price we must pay. Even official architecture is better than no architecture at all. The architects of London have had their fling since the War, and they have proved, with very few exceptions, unworthy of it. Unless control is established, there will soon be no London left. In some future age, under some apogee of taste as yet unforeseen, control may prove a menace to inventive talent. For the present we must be content to avert the dangers of the present. Carlton House Terrace has brought those dangers before the public and its parliamentary representatives in an acute form. It is now or never. Let us hope that, for once in our architectural history, it may be now.

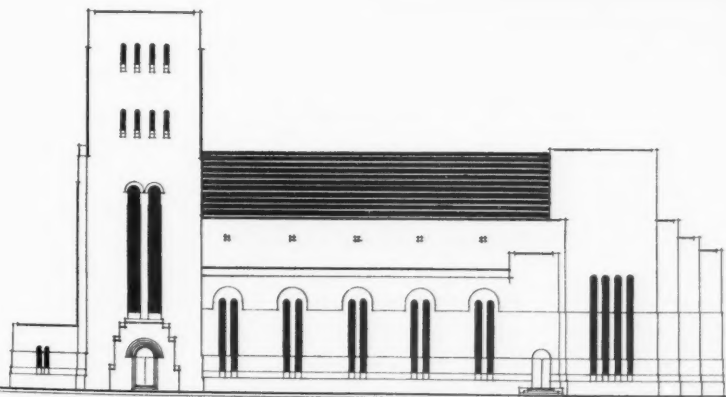


# A NEW CHURCH IN BLACKBURN

ARCHITECT ·  
F. X. VELARDE



1



2

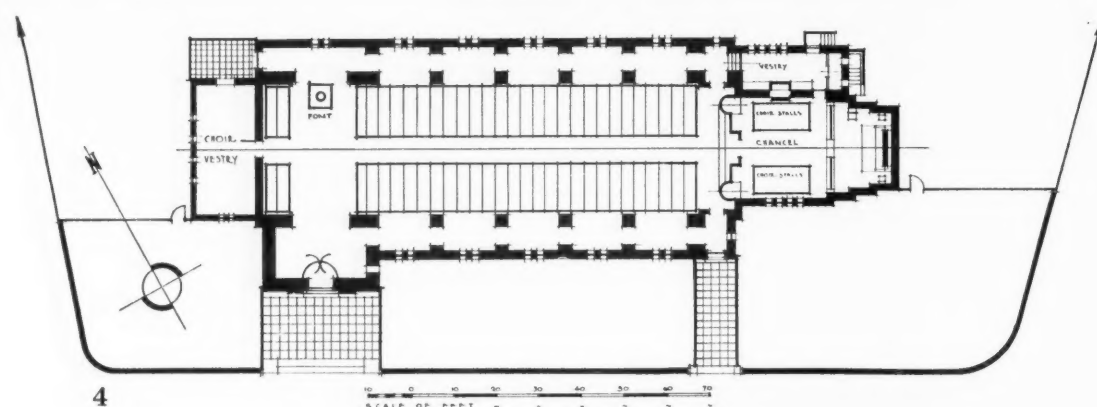
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The new Church of St. Gabriel's, Blackburn, is built in the centre of a modern municipal working-class suburb on the outskirts of Blackburn. The cost of the building was £15,000, and this has largely been borne by the parishioners. At the outset the Committee invited Professor Reilly to lecture to them on English and Continental Churches built in the modern manner, and at his suggestion they invited Mr. Velarde and Mr. B. A. Miller to prepare designs for their new church, Professor Reilly acting as consultant. The entire credit, however, for the design of the new building is, as the other two architects readily agree, due to Mr. Velarde. Externally the church is faced with narrow, deep, orange Stamfordstone bricks, set in coarse lime mortar with  $\frac{3}{8}$  in. joints. Very narrow black bricks define the stepped horizontal bands. Portland stone has been used sparingly to emphasize the doors, principal windows, etc. The main roof is covered with rough, heavy sand tiles, almost black in colour. The illustrations on this page are: 1, a view of the south front; and 2, the architect's drawing of the south elevation.

# A NEW CHURCH IN BLACKBURN



3



4

The interior walls are covered with rough sand plaster which has been coloured with a beige water paint. The heavy beams which support the narthex, 5 and 6, the chancel roofs and the heavy iron window bars, are painted a bright peacock blue. The windows are glazed with rough heavy semi-opaque glass, white in the large panes and deep blue in the smaller ones. The floor is covered with waxed oak blocks set in an unusual pattern. The pews, choir stalls and furniture generally are in waxed oak with sparing decoration in stainless steel. The chancel walls and pulpits, 3, are faced with Travertine marble and the upper surfaces capped with stainless steel. The chancel floor is lined with ceramic mosaic paving in three colours. The lamps are formed in stainless steel and stippled acid glass. The font is in Portland stone, with a silver lid and handle. The internal flush doors are painted a bright peacock blue and decorated with raised bars of stainless steel. The reredos is painted in two tones of brilliant red and decorated with raised ribs of stainless steel. The Holy Table is in waxed and limed oak. All the steps in the chancel are in Travertine marble.



5



6

# THE STUDIOS AT BROADCASTING HOUSE LEEDS

DECORATIONS BY JOHN C. PROCTER  
Architect.

RECONSTRUCTION BY M. T. TUDSBERY  
Civil Engineer.

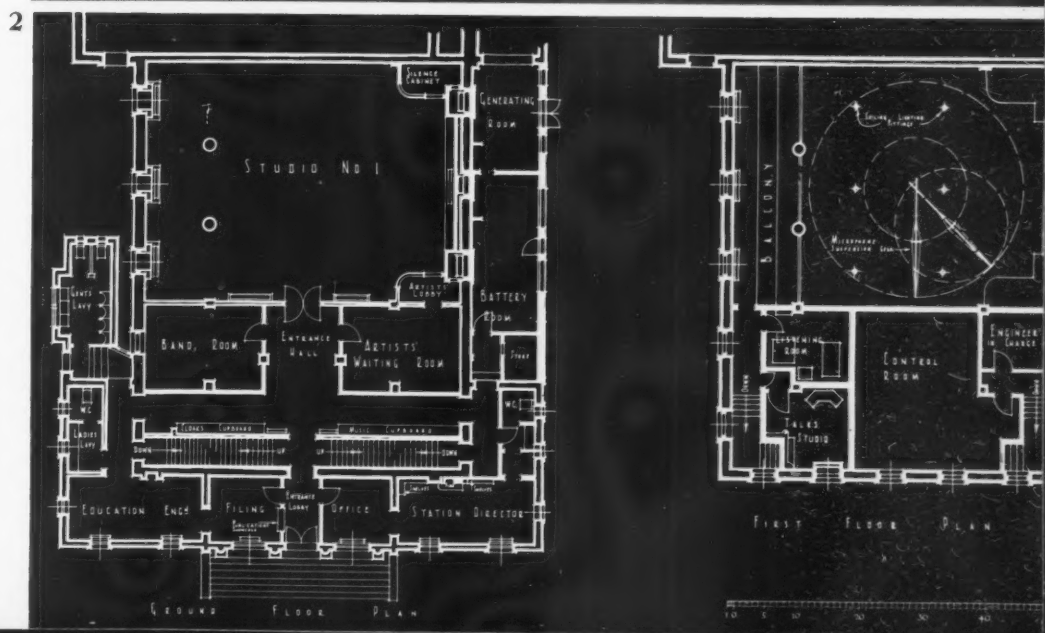
Broadcasting House, Leeds, is constructed in what was the old Quaker Meeting House, and No. 1 Studio is a portion of the former large Meeting Room, which had the usual gallery on two sides and one end.

The end gallery, though it still exists, has been buried between the ceilings of the band room and artists' waiting room, and the floors of the control room and listening room above. Of the side galleries, one has been removed altogether, but the other, altered and encased, has been retained.

1. Studio No. 1. This is the main studio. The old gallery, which formed the basis for the new one, was supported by a peculiarly ugly superimposed "order" of cast-iron columns, with heavily foliated bastard "Gothic-cum-Corinthian" caps. These double columns have been encased in fibrous plaster shells, filled with pumice concrete for acoustic reasons, giving the sturdy single columns now seen. They are painted ebony black, and are ringed at their bases with stainless steel.

It was desired to experiment with some form of microphone suspension which would avoid the necessity for trailing flexes, floor tripods, or awkward diagonal wires and winches. The scheme evolved is on the same broad principles as that designed by Mr. Wells Coates for the Dramatic Effects Studio at Broadcasting House, London, but in this case it was required that the microphone could be positioned anywhere within a circle 32 ft. in diameter, and at any height between 4 ft. 6 in. and 12 ft. above floor level. The apparatus shown in the illustrations allows these adjustments to be made by one man in a moment and, in addition, the microphone can be swivelled through a complete circle on its vertical axis, or placed at any angle to the horizontal. Oval section aircraft tube is largely used in the construction; the upper portion is painted, and the lower braced arm is chromium plated. The whole appliance revolves on ball-bearings in a lattice frame in the false roof, and a rubber-tired wheel on the studio ceiling, while other movements are controlled by Ferodo-lined friction joints and balance weights. The microphone flex is carried inside the arm from the roof above. As this Studio is used for many totally different types of broadcast, the general colour scheme is low in tone, black, greys, browns, and the oatmeal colour of the wallboard being relieved with the sparkle of chromium plate.

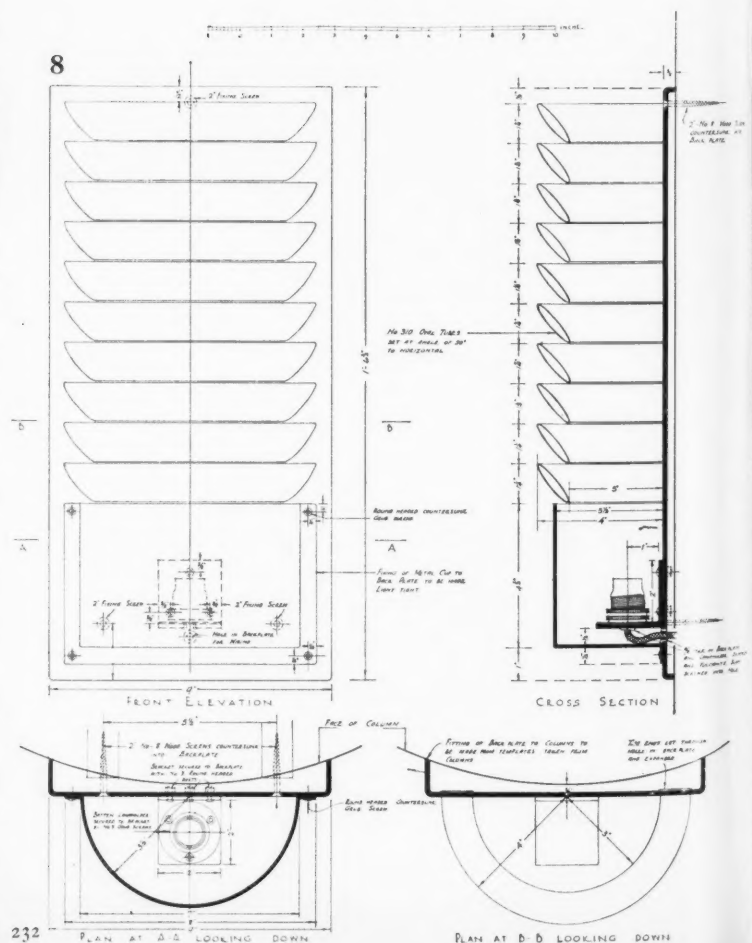
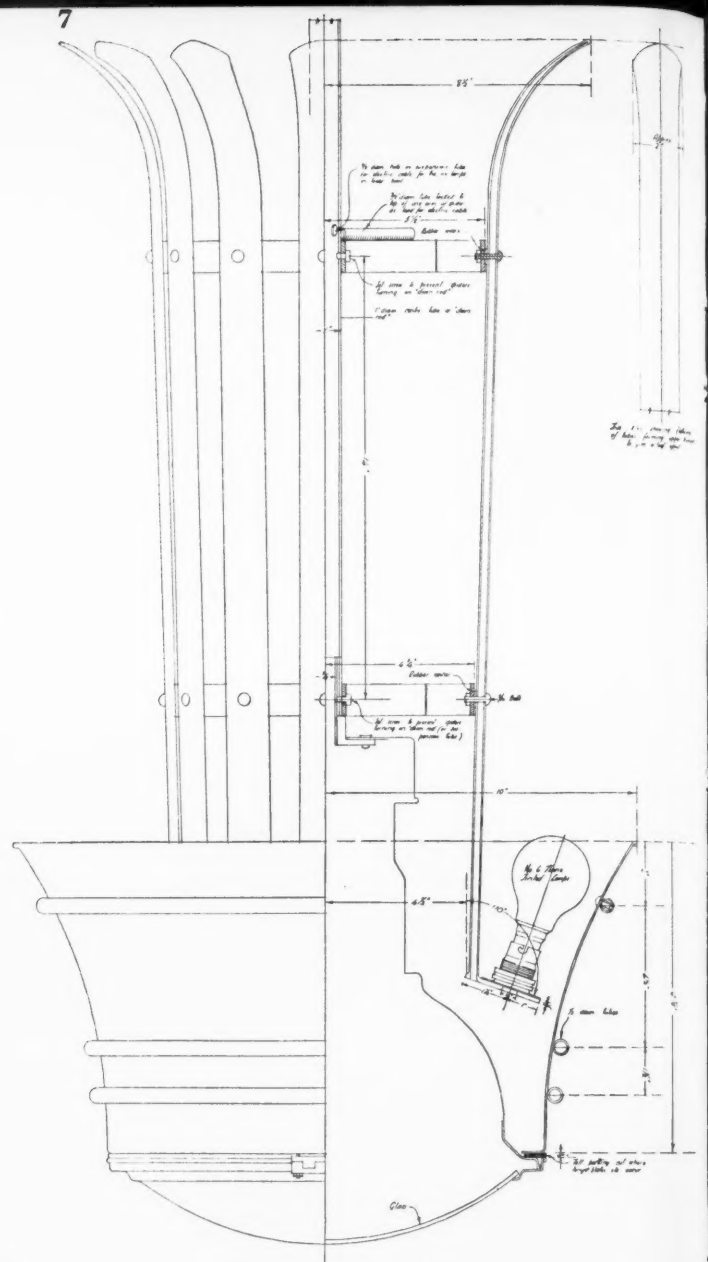
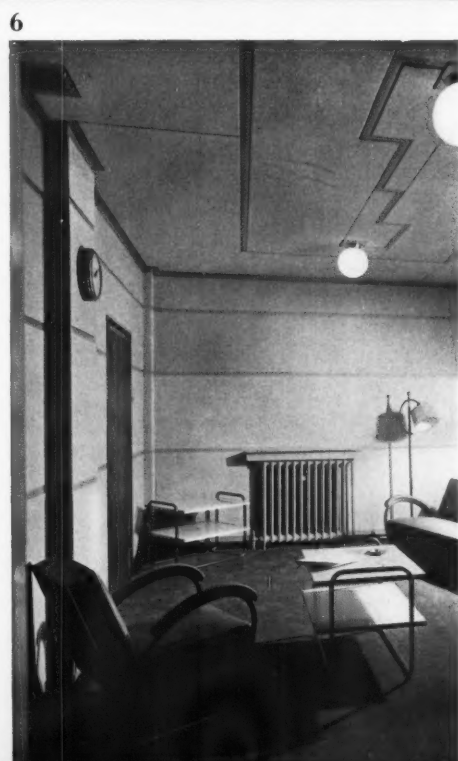
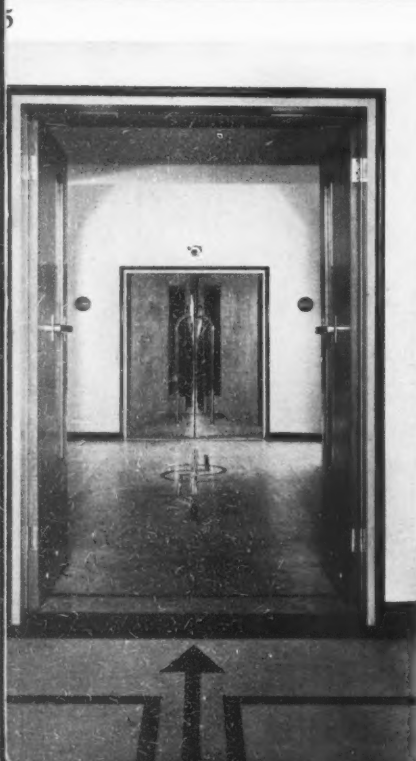
2. Plans of the ground and first floors.





# BROADCASTING HOUSE LEEDS

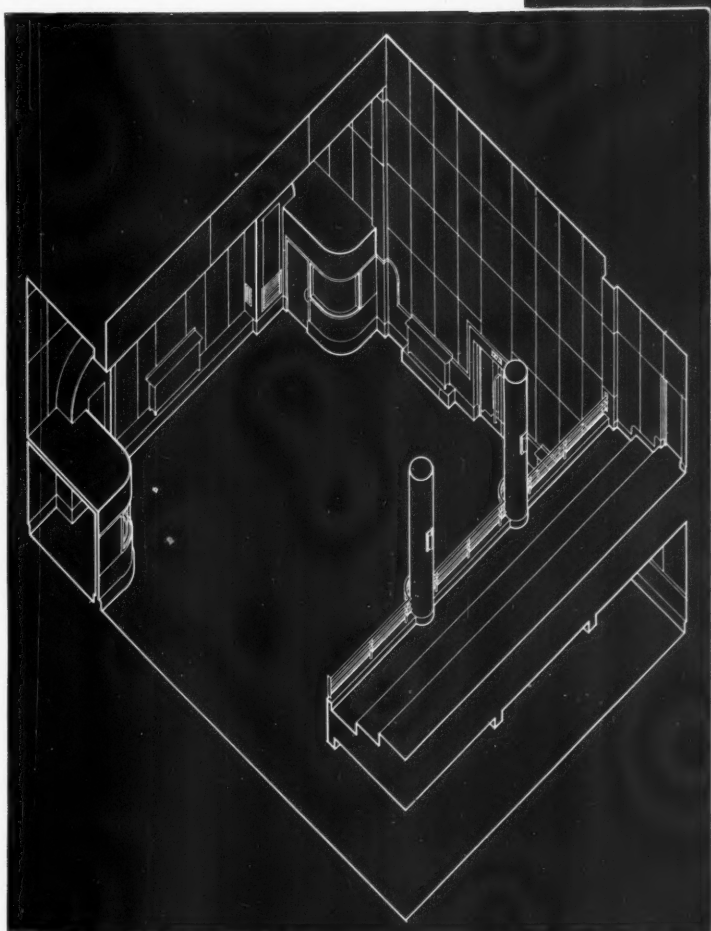
4. Looking towards the entrance doors in Studio No. 1. Only a small area of the walls has a sound-reflecting surface and this has been used in a parian plaster dado, painted a stippled, brownish grey. The remainder of the walls, the soffit and the ceiling of the gallery are covered in special insulating wallboard, left its natural colour, except between the silence cabinet and the artists' lobby, where the wallboard has been slightly water-stained grey, to prevent too sudden a break with the dado. The wallboard has been fixed vertically to accentuate the height of the room, and is attached to a plaster base with lino cement. The joints between the sheets are the plain "V" type and have no cover strips, or fillets, except on the silence cabinet and artists' lobby wall, where chromium-plated tube has been used on external angles, etc., in the same manner as a staff bead. A chromium-plated tube has been sunk in the wood dado capping and runs all round the room. The standard hollow skirting, containing the microphone wiring, the dado capping, and door frames are painted ebony black. The flush doors, 5, are stippled as dado, and the acoustically treated shutters to the three windows in the gallery are covered in a black and grey striped mohair.



9



10



The suspended acoustic ceiling is finished in lime plaster, and distempered a warm pink. The six baffle-boards covering ventilating exhaust outlets, and from which the six main electric light fittings, 7, are suspended, are painted a brighter pink. These pendants embody a standard commercial fitting with 300 watt lamp, which gives sufficient light in this studio to avoid the necessity of individual lighting to the music stands. In addition, each has six 40 watt lamps, throwing light on to the ceiling. A contact suspension gear with winches in the false roof allows the fittings to be lowered to the studio floor for cleaning and re-lamping. The fittings are all-metal, except for the convex glass of the lamp, and are composed of streamline, section tube. 6. The artists' waiting room. 8. The architect's working drawing of the wall lights on the columns for the gallery lighting in Studio No. 1. 9. Studio No. 1, as seen from the gallery. All the furniture in the studios is in chromium-plated steel tube, with upholstery in lemon-yellow hide. The occasional table tops are veneered bird's-eye maple. The orchestra chairs and gallery seating are of a standard nesting single chair type. 10. An isometric drawing of Studio No. 1.

# BROADCASTING HOUSE, LEEDS

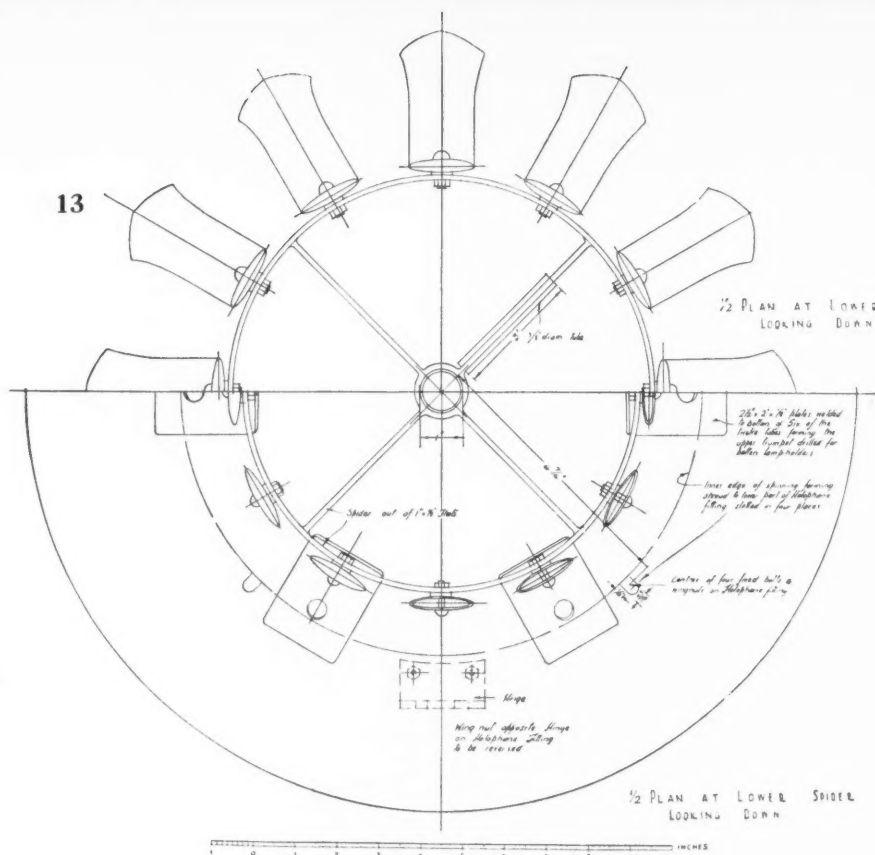
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12



11. A corner of Studio No. 1. 12. The Talks Studio (No. 2). The walls, floor, and ceiling are entirely covered with insulating board and the lower part of the walls are upholstered with a coral-coloured striped mohair fabric, as dado. The doors and acoustic shutters to the window are covered with the same material. The woodwork is painted willow-green, stippled with dull gold. All metal fittings and furniture are finished in dull brushed copper. The upholstery is in tan-coloured hide; the floor standard lamp shades are ebonized, spun aluminium; the carpet is deep terra-cotta, and the curtains terra-cotta, brown, and beige. 13. The architect's working drawing of the electric light fittings in Studio No. 1.





# A HOUSE IN SURREY



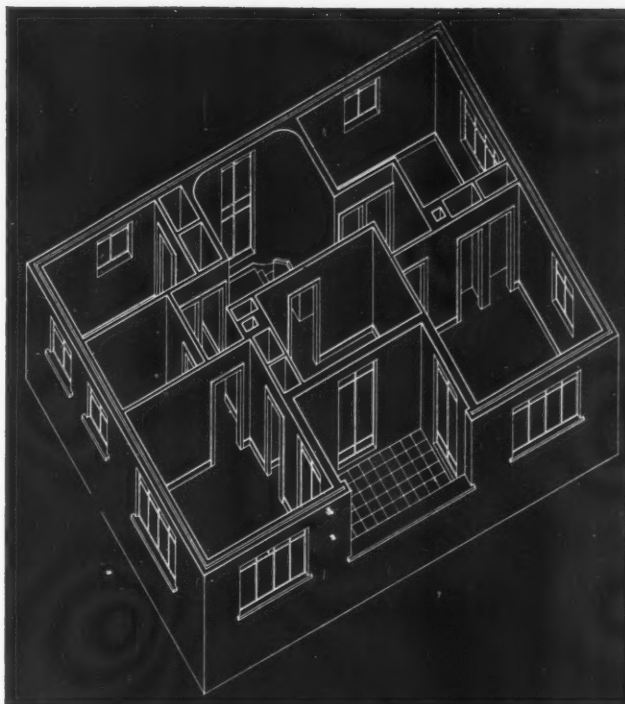
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"The Yews," Ridgeway, near Leatherhead, Surrey, shows an attempt to provide a simple contemporary dwelling for a small family. The main living room is 25 ft. 11 in. in length, by 14 ft. in width, and the accommodation includes also a dining room, kitchen, etc., a roomy entrance hall, built-in garage with direct access to the house, and a second bathroom on the ground floor. The first floor has three family bedrooms, a double spare bedroom and a maid's bedroom, with bathroom, really ample built-in cupboard accommodation, and a large balcony serving three of the bedrooms. Access from the balcony is obtained to the flat roof, covering the whole of the building, from which extensive prospects are obtained. This roof is of asphalt on boarding. The ceilings throughout are of insulated boards; the plaster generally is the usual three-coat work. The baths are of the enclosed type.

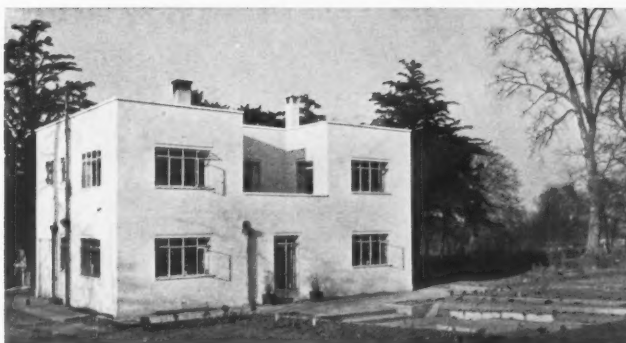
The cost per foot cube, including hot water, a modicum of central heating, electric wiring, etc., but not including paths or fences, worked out at almost exactly 1s. 0½d.

Illustration 1 is the north entrance front showing the general effect of the cream-washed brickwork, the window treatment, and the entrance. The hood is of reinforced concrete, and the photograph shows the front door open and the inner glazed lobby door. 2. An isometric drawing from which can be seen the arrangement of the first floor, and the access to the balcony from the three bedrooms looking south. Access to the flat roof, covering the whole of the building, is obtained from this balcony. 3. The house from the south-west. This is the main garden front, and shows the first floor balcony and the flat roof. The ground slopes upwards from the house, and a sunk garden has, therefore, been formed in roughly cast concrete slabs.

The architect was Frederick Etchells.



2



3

# A HOUSE IN SURREY

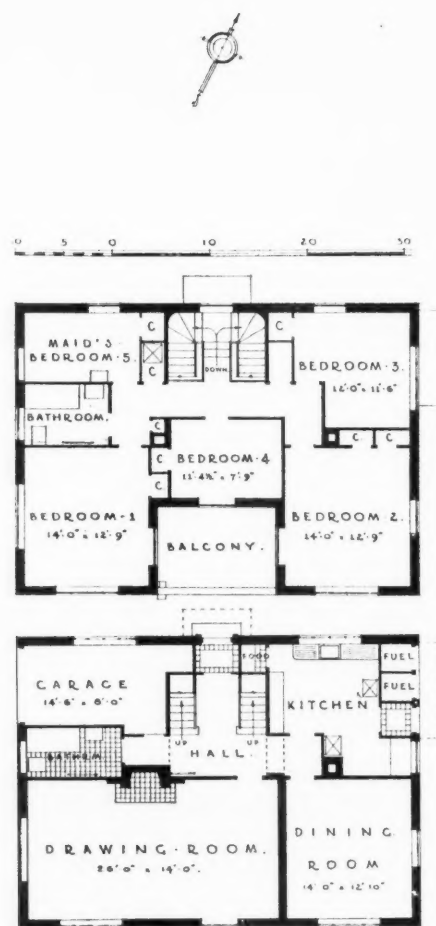
4. The photograph shows the "turn" of the staircase and its tall metal window. The balustrading is solid, faced with birch plywood. 5. The front door taken by artificial lighting and giving a clear impression of the effect of the cream-washed brickwork. The hood is of reinforced concrete, and the surround is cement-rendered. The front door is of the flush type, covered completely with metal-faced plywood, and both this and all the fittings (i.e., lock, letter-plate, etc.) are finished with a matt aluminium cellulose treatment; the door handle is of aluminium alloy, left with a bright surface. 6. Plans of the ground and first floors. The walls are in 11 in. cavity brickwork, of Flettons with Rustic Fletton facings cream-washed. The windows are of metal, specially made but of a standard section. The double staircase was included at the special desire of the client. The three "family" bedrooms open on to the balcony.



4



5



6

# Persian Architecture & the West

BY STANLEY CASSON

IT is a common mistake to confuse the manner in which architectural influences are transmitted with that by which artistic changes occur. A change of style in art is almost always dependent upon influences which come from outside. Sometimes those influences are merely formative, sometimes they overwhelm the native style of the country which adopts them. But in both cases the manner in which those influences arrive is wholly different from the manner in which architectural influences arrive. Saxon England, to take the case with which most people are familiar, became at the outset of its period of artistic productivity, deeply beholden to the Carolingian and Byzantine influences of Central Europe and the Near East. Those influences took the concrete form of actual importations of small works of art which Saxon craftsmen were able to study at first hand and use as models. Trade and travel imported all that was necessary to control the new style which constituted Saxon art. What was imported gave an inevitable Byzantine flavour to Saxon art from the period of the great sculptured crosses of Northumbria in the eighth century to the immediately pre-Conquest masterpieces such as the crucifixes of Langford and Romsey. The prototypes are to be identified and the connections are clear.

But with architecture it is far otherwise. You cannot transport buildings, nor do architectural features and details constitute trade commodities. If the influence of the architecture of one country is to permeate to another it can only come by means of the actual architects themselves, and architects are not as a rule objects of merchandise!

Their arrival or departure is not necessarily governed by economic laws, but dependent rather upon chance, catastrophe and accident. To take Saxon England again—the very opposite is true of Saxon architecture to what it is of Saxon art. Saxon churches reflect in hardly any detail, and certainly not in general character, the churches of the Near East. They are essentially indigenous and derived partly from Roman styles in Britain or from secular buildings common to Britain and the nearer continental countries. And this is because no Eastern architects reached these shores, or at any rate none who were prepared to challenge the indigenous style.

For an architecture to penetrate a country in which it is not native we must presuppose many conditions. Firstly, one or more architects of the invading style must come in person, with his plans, details and style already in his

head. His pupils must learn directly from him. The native architects cannot, like the native artists, sit down with

models to copy. The missal, the small ivory or the gold reliquary can serve as inspirations to the artist or even to the sculptor who works for an architect. But there is nothing of the same kind which will enable the architect to acquire new ideas in his building, except perhaps rough sketches of buildings in foreign lands made by travellers, or general impressions of buildings conveyed by word of mouth by those who have seen them. Apart from this, the immigrant architect alone can be the medium of the introduction of a new style.

I have attempted thus to suggest the two means by which alone a style of architecture can change, the direct influence on the one hand and the vague and indirect on the other. When, therefore, one detects a change of style gradually occurring in a native architecture, it is probably due to the indirect influence. An abrupt change is due to the direct. Thus the Byzantine churches of Ravenna are due to the direct intrusion of authentic Byzantine architects, just as the Norman buildings of Sicily or the Gothic cathedrals of Cyprus are the work of imported architects. But a gradual change like that which occurred when Romanesque architecture gave way to Gothic, or when "Perpendicular" metamorphosed into Italianate, was largely due to the introduction of new ideas piecemeal and of general impressions hastily recorded by travellers. In consequence the gradual change of style first evinces itself in the general features rather than in the detail. The traveller who returned, as pilgrim or Crusader in the eleventh century, would have recorded his impressions of the architecture of, say, the great Moslem mosques of Persia or the cathedrals of Armenia, by stressing the space of the interior, by expressing his amazement at the height of pillars or the value of vertical lines. Such comments would have conveyed at once to the professional architect the immense difference between the buildings of his own country and those of the country from which the visitor had returned.

The architecture of Britain is all too often treated as a self-contained whole which exhibits a development from Saxon to Romanesque, with a Carolingian interlude.\* The Romanesque is thought to have merged slowly into the Gothic and the Gothic into the "Perpendicular." This is the traditional story told by the guide-book and the

\* See Clapham; *English Romanesque Architecture*. 1930. Ch. IV.

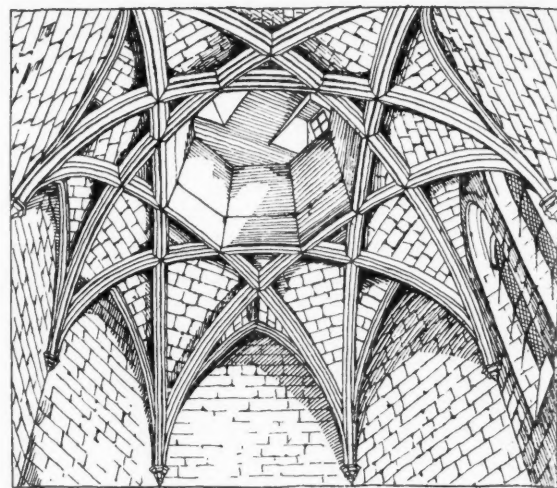


## PERSIAN ARCHITECTURE AND THE WEST

antiquary. The approach of alien influences, direct or indirect, is seldom discussed. It is with some of those influences that this article is concerned.

Art-history and academic studies of historical events which may have influenced architectural growth is a tedious business. Yet it is important, for without it the changing stream of architecture is almost incomprehensible. And, after all, the historical aspect need not consist of the mere dull cataloguing of duller events. It may at times prove to contain the germ of romance and the substance of drama. To connect the growth of Gothic or the plan of Western churches and even the detail of their structure, with remote happenings in the uplands of middle Asia may seem speculative, yet to such speculations is one inevitably led after a brief reflection. English history as taught to children consists largely of a statement of the importance of England. The Saxons are conceived as living in a self-contained world of their own; the Normans as a race who came to England to be Anglicized; the Crusaders as noble heroes who went to the East to civilize it and give it the advantages of a primitive form of Public School spirit! But from the standpoint of world history the Saxons are better conceived as a sophisticated and cosmopolitan race dwelling in what was, in the ninth and tenth centuries, one of the few undisturbed parts of Europe. The Normans as a race of barbarians who brought this cosmopolitan culture to an abrupt end; the Crusaders as a gang of robbers who taught nothing and learned nothing, not even how to fight efficiently. While away in the East at the same period was the full glory of Byzantium and the complex and cultured civilization of Persia and Armenia, the three areas having a profound knowledge of the arts and of architecture, of the subtleties of engineering and structural building and of all the arts and sciences then known. Orthodox hand-book-history treats these cultured people as mere barbarians who were waiting for the flame of culture to reach them from the West; in reality, all the movements were in the opposite direction, and it was invariably the East that sent the influences. But how it sent them is one of the several matters which I propose to consider.

Church architecture in the East differs fundamentally from church architecture in the West in one main point. The Persian mosque, and with it the Armenian or Georgian church and the Byzantine church, have in common, at all periods, the main characteristic of being constructed solely for



The Vault of the Prior's Kitchen in Durham Cathedral. Reproduced from Bond's *Gothic Architecture in England*, by courtesy of Messrs. Batsford.

religious purposes and of being derived from religious and not secular origins. They are throughout buildings made for worship. For this purpose the church is in a sense a microcosm of the universe in that it is a meeting place under a vault or dome, that vault or dome being, as has been clearly explained elsewhere\* a "high-place" for purposes of worship. The "high-place" in the Byzantine church is the more clearly designated as such by the delineation in the dome of the figure of Christ the Ruler, such as we see in the astonishing mosaics at Daphni, near Athens, at Holy Luke, in Phokis, or in a dozen similar buildings. In the Moslem mosque there was naturally no such attempt to make plain the meaning of the dome of Heaven, but it was none the less clear to the worshippers. In both cases the principal ceremonies took place beneath the dome.

There was no particular place for the worshipper as such, and the priest carried out his tasks in the centre of the building. This conception of the church as combining the characteristics of the vault of Heaven with the sacred spot for worship is peculiar to the East. In the West ecclesiastical buildings were in the main modelled on secular origins. The Saxon church was little different from a glorified banqueting hall or a Roman granary; the Carolingian church, with its enormous nave and its towers at each end was a variant on the Roman basilica. The Norman church, as with some of the later churches, developed towers which had something of

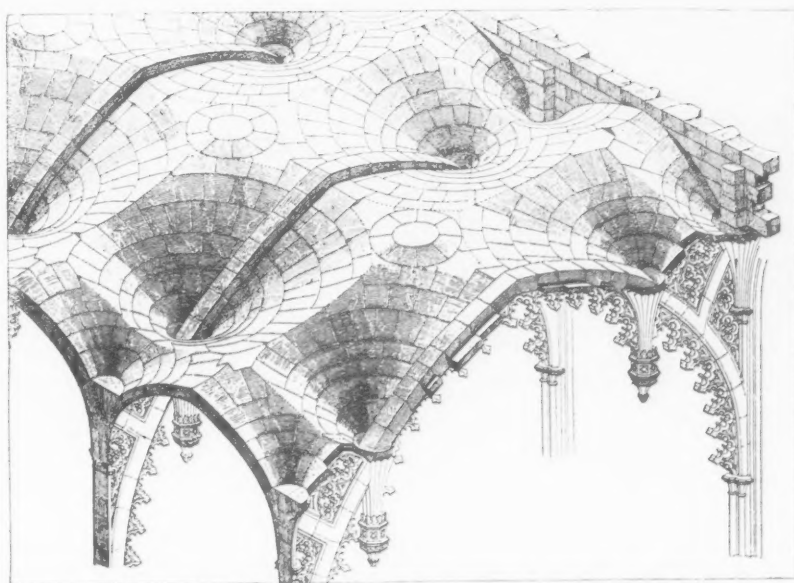


Left.—Masjid-i-Jami, Isfahan. The arches and vaults on the south-east side of the Great Dome Chamber. In this building the ornamental ribbing may be the origin of ribbed-vaulting. The comparison with the



vaulting in the Prior's Kitchen at Durham Cathedral is interesting. Right.—The nave of Ely Cathedral. Only in the Gothic part of this cathedral is the "vista" attempted.

\* C. Barman; *Architecture* (Benn Booklets), p. 8 ff.



Masjid-i-Jami, Isfahan. Rear of north-west Iwan showing ribs and buttresses. This mosque was begun in the late eleventh century. In this exterior view are ribbed domes which are identical in character with English ribbed vaulting, as can be seen in the lower illustration, which is from Henry VII's chapel in Westminster Abbey, though here they give external support. It is probable that our ribbed vaulting was derived from this and similar work. Armenian churches actually employ internal ribbed vaulting at an earlier date still. The illustration of Henry VII's Chapel is reproduced from Bond's *Gothic Architecture in England*.

PLATE ii

June 1933



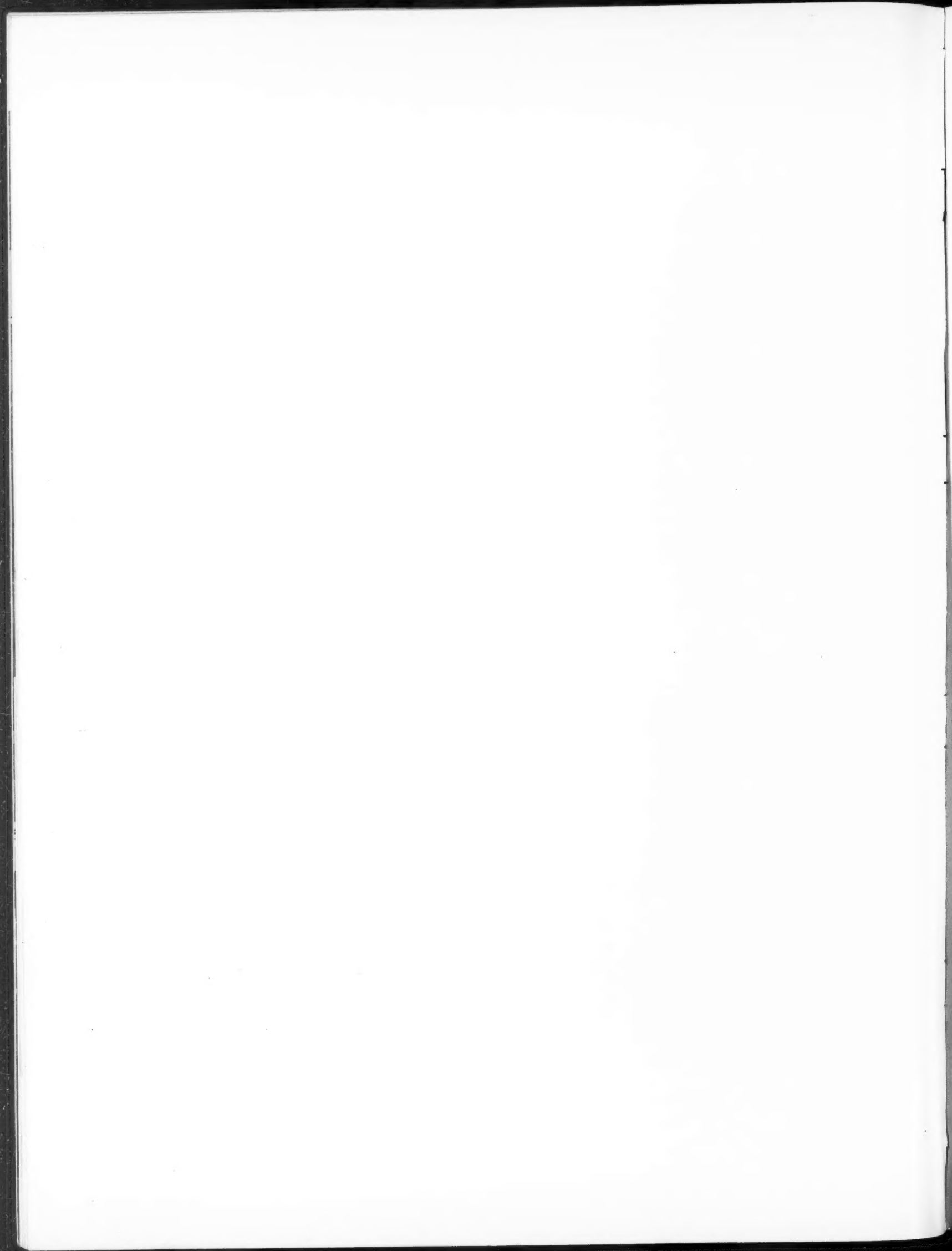




*Left.*—Masjid-i-Jami, Isfahan. North-east Iwan. The colonnades and vaults of the first aisle looking south-east. *Right.*—The south choir aisle of Durham Cathedral. Allowing for the difference in the pointedness of the arches, and in the manner of their springing from the pillars, there is in these two buildings the same intention—an attempt to give a long vista of columns surmounted by a vaulted roof. The architectural problems are differently solved, but the general intention is identical in the two buildings. At Ely Cathedral the same long-distance effect is aimed at.

PLATE iii

June 1933



the nature of the central point of interest of the Eastern church, but the towers were projections on the roof rather than hollow vaults into which the worshipper could look. Actually from the inside it would not be apparent to the worshipper that there was a tower at all. Later the tower became a mere repository for bells and its function as the container of a "High-Place" was never apparent either to the architect or to the ordinary observer.

Yet the East approached very near to the West. Distant Armenia and Persia penetrated far into Europe. For in the eighth and ninth centuries the great Khans of Bulgaria imported Greeks and Armenians to build their palaces in the Balkan hills.\* In the same way Greek and Armenian architects were hired by the Sassanian rulers of Persia, and the early dynasties of Armenia were of Persian blood. The residence of Christian refugees in Persia at a time when Christianity was persecuted in the late Roman Empire, had already laid the foundations of this later relationship. So that into the fringes of Europe were penetrating peoples and influences from the distant hills of Persia and the Caucasus. And many of these influences were direct, that is to say they consisted of actual Armenian and Persian and Byzantine workers, who knew the architecture of those lands.

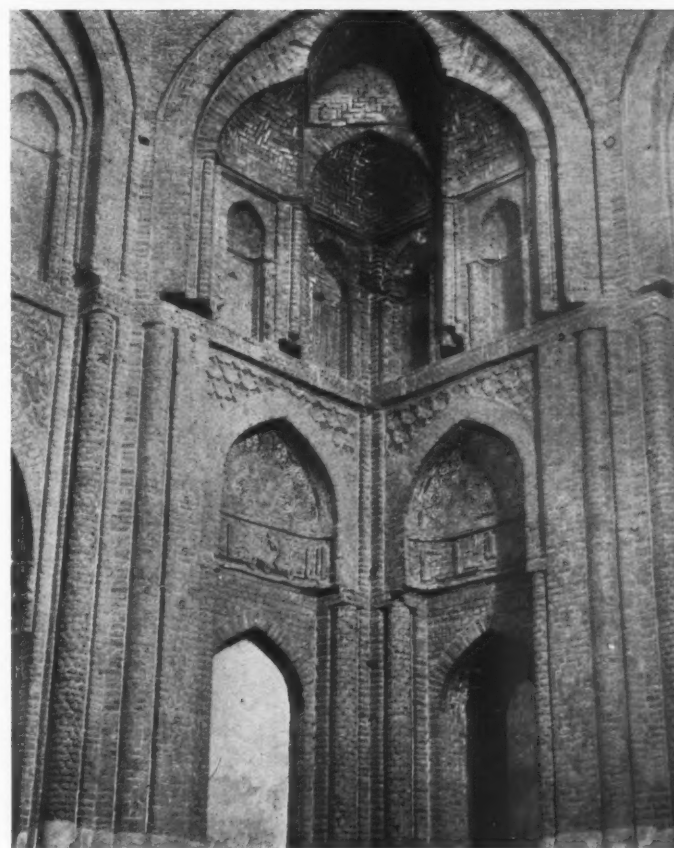
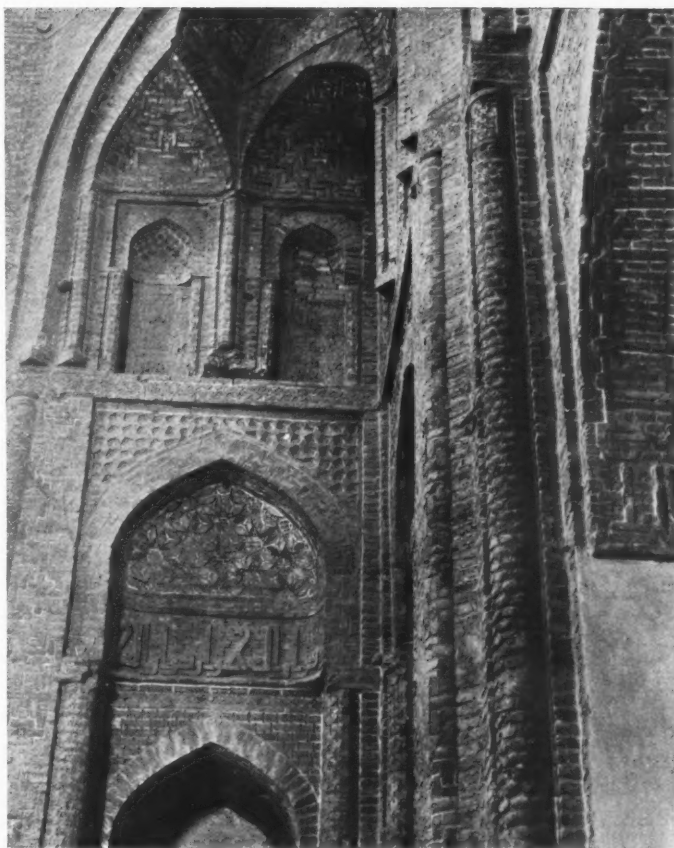
Now Gothic architecture has been described as differing from preceding architecture in the following points. It used the pointed arch. It employed for the first time the "ribbed vault." It laid all its emphasis on the vertical lines of building, rather at the expense of the horizontal. It sought for the maximum of light, by means of a decorative subdivision of windows into small areas easy to glaze, so that the total area of the window should be as large as possible. Finally it concentrated on the decorative value of architectural detail, such as buttresses, gables, flying-buttresses and cornices, beautifying them with sculptural additions.

Few would dispute that these are the main features of Gothic method. But, on examination, it is clear that the most important of these features are the use of the pointed arch, the general characteristic of emphasis on vertical lines and internal space, and the use of that most unusual thing, "ribbed vaulting."

Now Gothic architecture is in no sense a true development from Romanesque. If anything is in true descent from Romanesque, it is Renaissance or Palladian architecture, not Gothic. Gothic marks an abrupt change. The Romanesque rounded arch could never normally have developed into a pointed arch. Circles do not naturally metamorphose into pointed ellipses any more than into rectangles. They do not indeed change into anything, for they are in themselves finished things. The pointed

\* S. Runciman, *Byzantine Civilization*, 1933, p. 278.

Top.—Masjid-i-Jami, Isfahan. A view into the south-east corner of the small dome chamber. The main shaft seen in this view does not conform to the rectangular shafts required by brickwork, and was probably derived from, or influenced by, Armenian fluted shafts. The similarity with Gothic shafting is evident. Bottom.—Interior of the small dome chamber. Here is a wide view of the "Gothic" shafts and piping of a Persian mosque.





arch on the other hand easily changes into the flattened "Tudor" arch. That is a normal evolution. So that the appearance of the pointed arch implies some sudden intrusion into the architectural repertoire. So with the "ribbed vault." There is nothing consequential about it. It is not a consequence of the barrel vault nor yet of the Saxon or Romanesque arch. And so, too, with the sudden realization of the value of vertical lines emphasized by the shaft and the multiple pillar that supports a roof. That had not been realized by Romanesque nor yet by Saxon, and rarely by Byzantine builders. And these seem to me to be the very essence of Gothic architecture; they are its main features. The use of windows for colour and light; the elaboration of windows architecturally and the employment of the sculptor to decorate, are but additions evolved by Gothic genius based upon the main changes in style.

And one naturally asks: "Where did the influences come from that produced the abrupt changes which constitute the essence of Gothic style?"

I have not yet seen this question faithfully answered, and here I propose simply to hint at a possible solution.

The pointed arch has an eastern history, which gives it a priority in time in the East. Throughout Persia it is universal.\* It is seen in company with the multiple shaft with vertical emphasis in the great Masjid-I-Jami, at Isfahan, in a fully developed form by A.D. 1199. But its history is much older than that. A perfect example of a stone arch almost indistinguishable from full Gothic is seen in the Nilometer on the island of Roda, dated to A.D. 861. Here are even the typical Gothic flutings and supporting side pillars.† It is, in fact, an oriental invention of universal use and there are a score of apt examples to quote, which all precede in date the first European examples.

For the great multiple columns of stone so characteristic of Gothic architecture we must go to the Cathedral of Ani in Armenia where even the column-bases are identical with Gothic and the arrangement of the clustered columns similar.‡ For rib-vaulting hardly distinguishable from Gothic we go again to Armenia, where one good example out of many can be seen in the porch of the church of Aisasi.§ In fact the story of similarities becomes almost tedious. Nor are they similarities of chance. For we have

\* Pope, *Introduction to Persian Art*, p. 21.

† The same, Fig. 3.

‡ Strzygowski, *Christian Church Art*, Fig. 23.

§ Strzygowski, Fig. 25.

The vaulting in the north aisle of Gloucester Cathedral springs from the large round Norman pillars in the same way as in the Masjid-i-Jami at Isfahan. The vaulted area bears the same relation to the mass of the columns as in the mosque.

already seen that Armenian artists were, at an early date, on the fringes of Europe and that they had acquainted themselves also with Persian architecture.

But it is in Persian architecture that the mainspring must be sought, for it and Armenian architecture, and to a less degree that of Georgia, are a common fabric.

The main difference between Persian work and that of Armenia is that the Persians were compelled, through shortage of stone, to work in brick. But the way in which they utilized their brickwork shows that they were not mere connoisseurs of brick pattern, but superb builders who made bricks conform to their designs rather than subordinate their design to the exigencies of brick. As Sir Edwin Lutyens has pointed out\* they did their building without the aid of wooden framework and supports. They built domes and arches of brick by "feeling" each brick and placing it as a separate item into the main shape in the architect's plan. They used no keystones and treated bricks as if they were parts of larger wholes. In effect they were building geometrically and made the bricks do what they would have made stone do, had they used it. The result, as Sir Edwin points out, is that, as brickwork, the building is disastrous, but as architecture it is superb. And it is from these geometric forms and conceptions that I am convinced the spirit of Gothic architecture sprang. The Armenians who built their own cathedrals in Armenia and the Persians who employed them and then learned from them, were the originators of the style that swept over Europe by virtue of its new use of interior spaces and its deep knowledge of geometrical forms and contents. The intermediaries who spread the new ideas were probably those wandering Armenians and Greeks who worked in

the Balkans. From there to Hungary is a brief distance. In Moldavia, on the borders of Hungary, you will see churches of the thirteenth and fourteenth centuries, particularly in the Bukovina,† which actually combine Byzantine and Gothic elements. Here in an area where styles were retarded and influences flowed back after a long lapse of time, the Gothic arches now established in the West were still combined with the domes and vaults and cupolas of an eastern church. But in origin it was Persia who had led to the Gothic change and endowed the West with some at least of its architectural genius. The "High-place," and its dome was not transmitted, but many other features were. The basilica-building of the West was too strong a tradition to be eradicated by the dome-building of the East.

\* *Country Life*, February 4, 1933.

† *Les églises de la Moldavie*, P. Henry, 1930.



# THE NEW GORILLA HOUSE

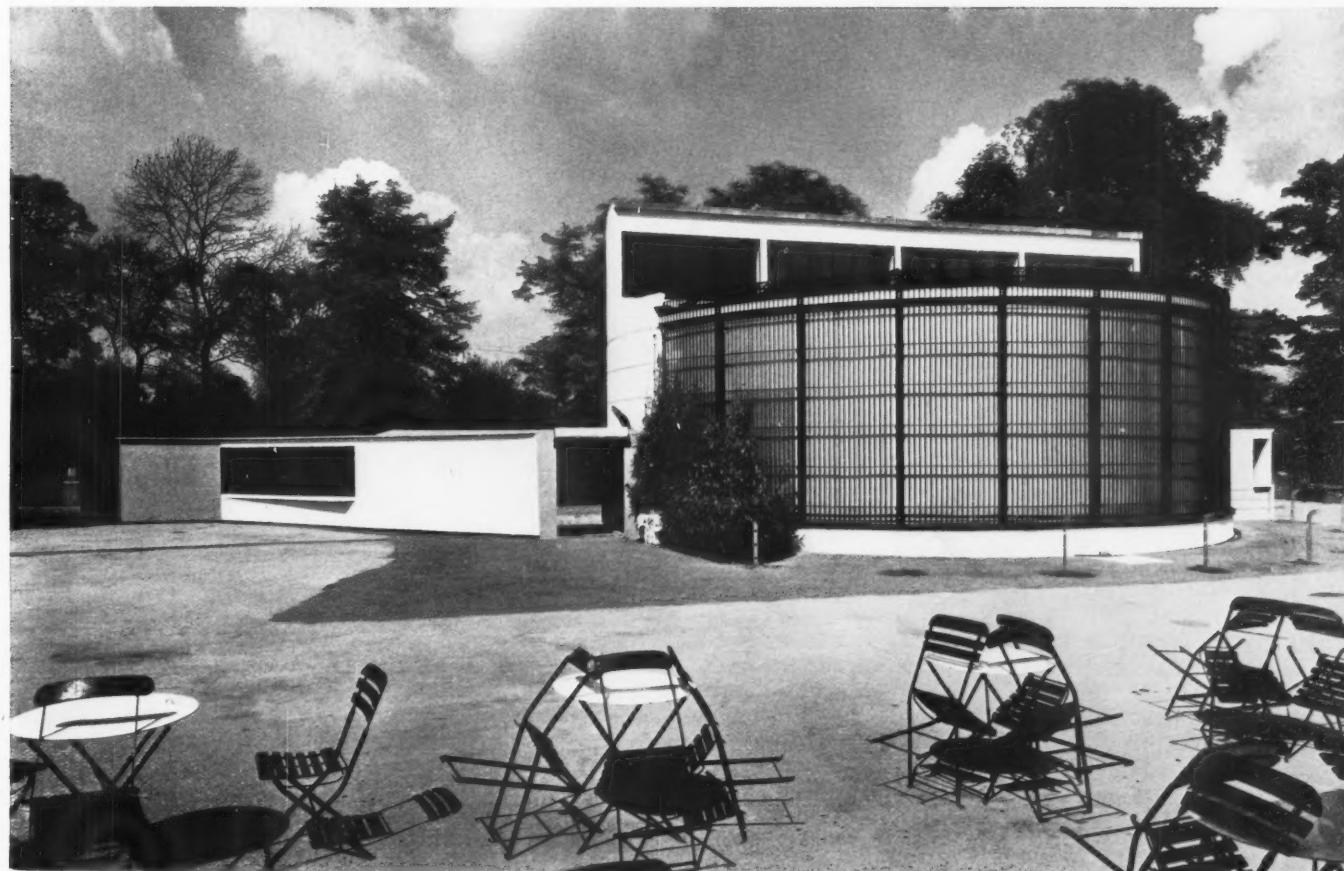
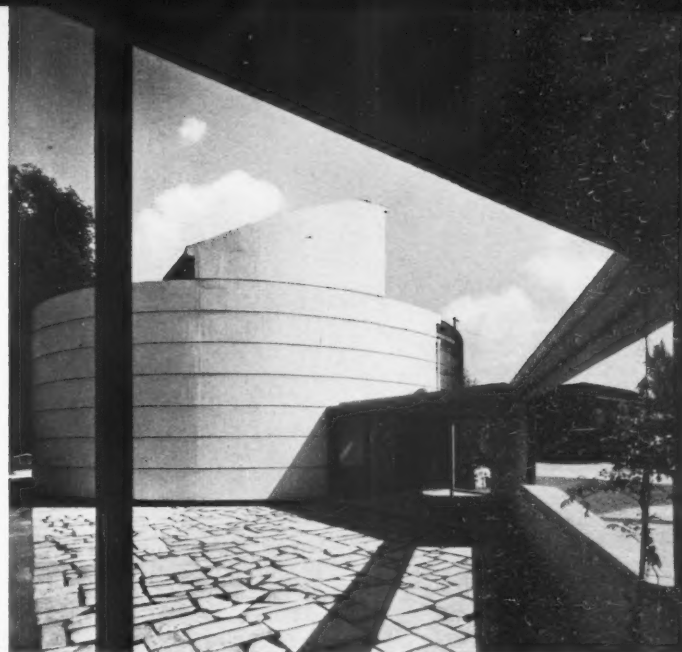
ARCHITECTS • TECTON

THE problem before the architects for the new Gorilla House in the Zoological Gardens, London, was to accommodate the animals in such a way that in summer they should be as completely in the open air as possible, while in winter they should be protected from the effects of our climate that too often prove fatal to anthropoid lungs; and to do this without adding one more to the dismal winter array of empty out-of-door cages. To this end it was suggested by the secretary of the Zoological Society, Sir Peter Chalmers Mitchell, that the outdoor summer cage should be convertible in winter into a hall for visitors, and since they, hardly less than the gorillas, need protection from the cold, it was essential that this space should be provided with temporary walls and roof. These considerations decided the circular plan of the building, making it possible for a semicircular revolving structure to surround the open cage in winter time, and to slide round out of the way behind the enclosed half of the cage when the weather allows the animals to occupy their open-air quarters.

Gorillas are liable to the diseases of man, and are therefore protected in winter by glass screens between themselves and their public. These screens can be slid away and disappear, as it were, into the wings, when the summer cage is open. In the open air a space of eight feet divides the cage from the infecting public, who must stand outside the low railings. These railings were not in place when the photographs were taken, but their upright standards can be seen.

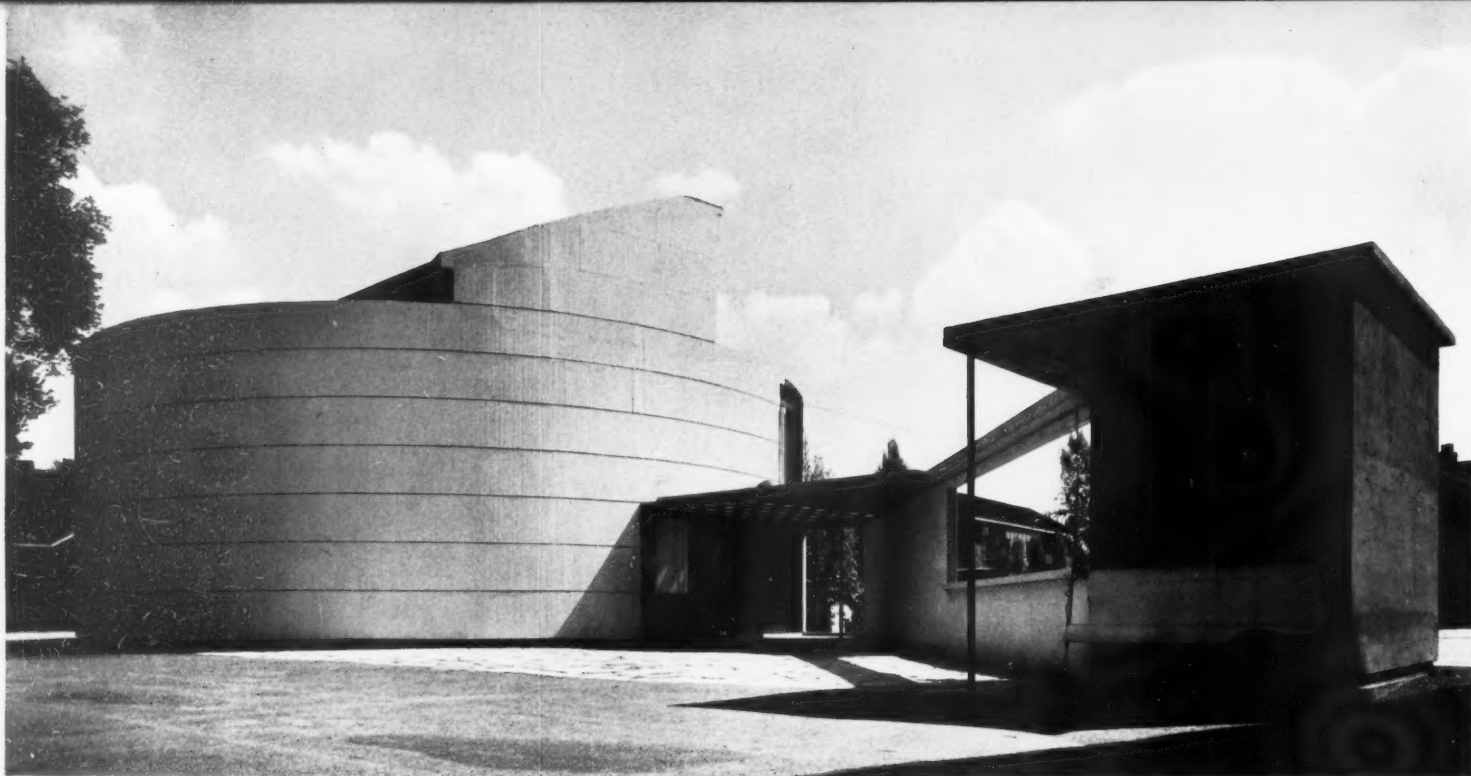
Outside the main circular portion of the building are a large entrance porch and a smaller exit porch. Their shape emphasizes the natural flow of public circulation through the Zoo, and gives direction to the wanderings of visitors, at the same time adding scale to the main structure.

1. The Gorilla House from the entrance porch.
2. A view from the west. 3. From the south.

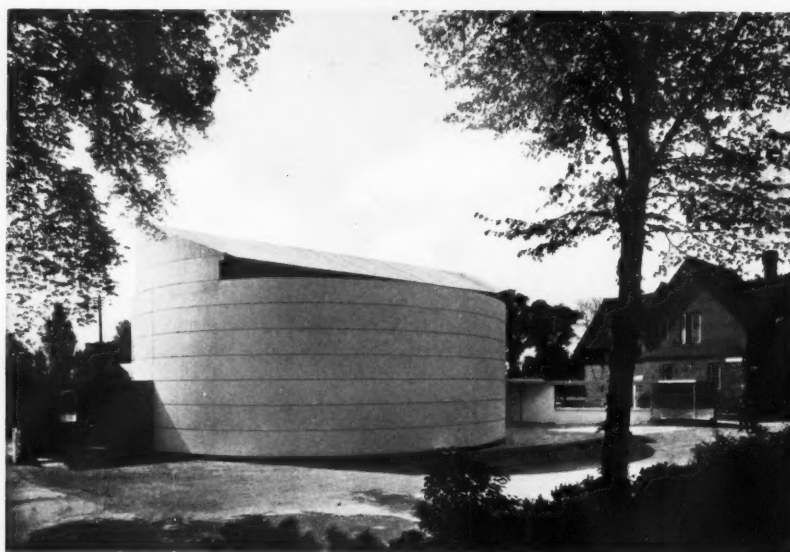


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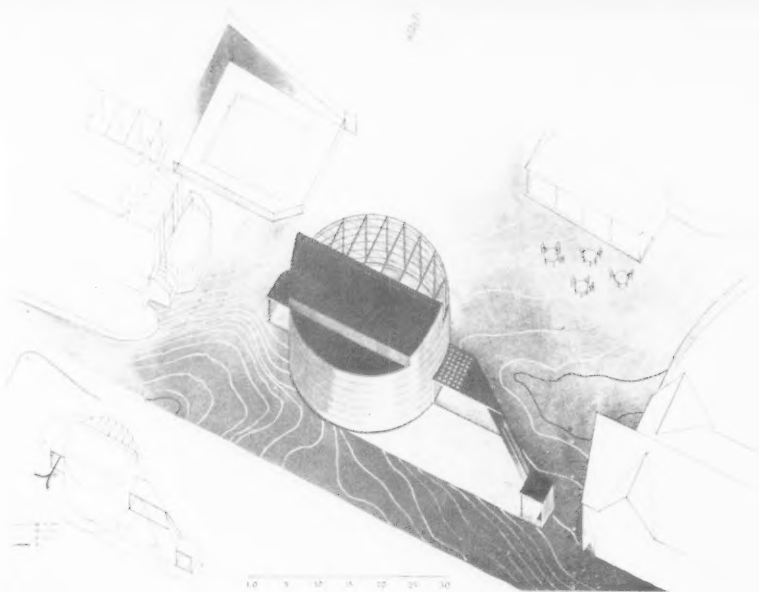
The Gorilla House has been designed primarily from a functional point of view, to be an adequate solution of a double problem: first, to house a pair of delicate tropical animals so that they may be healthy in a northern climate, and secondly, to provide the best possible show for the public. These being its objects, it was held that the manner neither of the Swiss chalet nor of the Renaissance pavilion were suitable for the purpose. The double object of science and visibility demanded the simple lines and plain surfaces that have been adopted. Further, the terraces of Regent's Park, by which the Zoo is surrounded, suggested a dark cream for the outside of the main structure. The porches are finished in grey, white, blue and black.

Inside, the colour scheme was chosen to eliminate the oppressive sense of prison that is apparent in many animal cages, by imparting a sense of openness and distance.

The background and the bars are blue. The walls of the passage and sleeping boxes, which constitute a foreground in the cage, are yellow. The bars where they must be seen through are black, since this colour interferes least with the sight; elsewhere they are the same colour as the surface behind them.

The interior of the revolving structure is lined with natural birch.

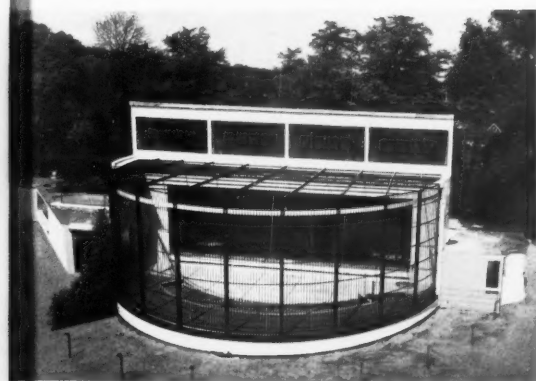
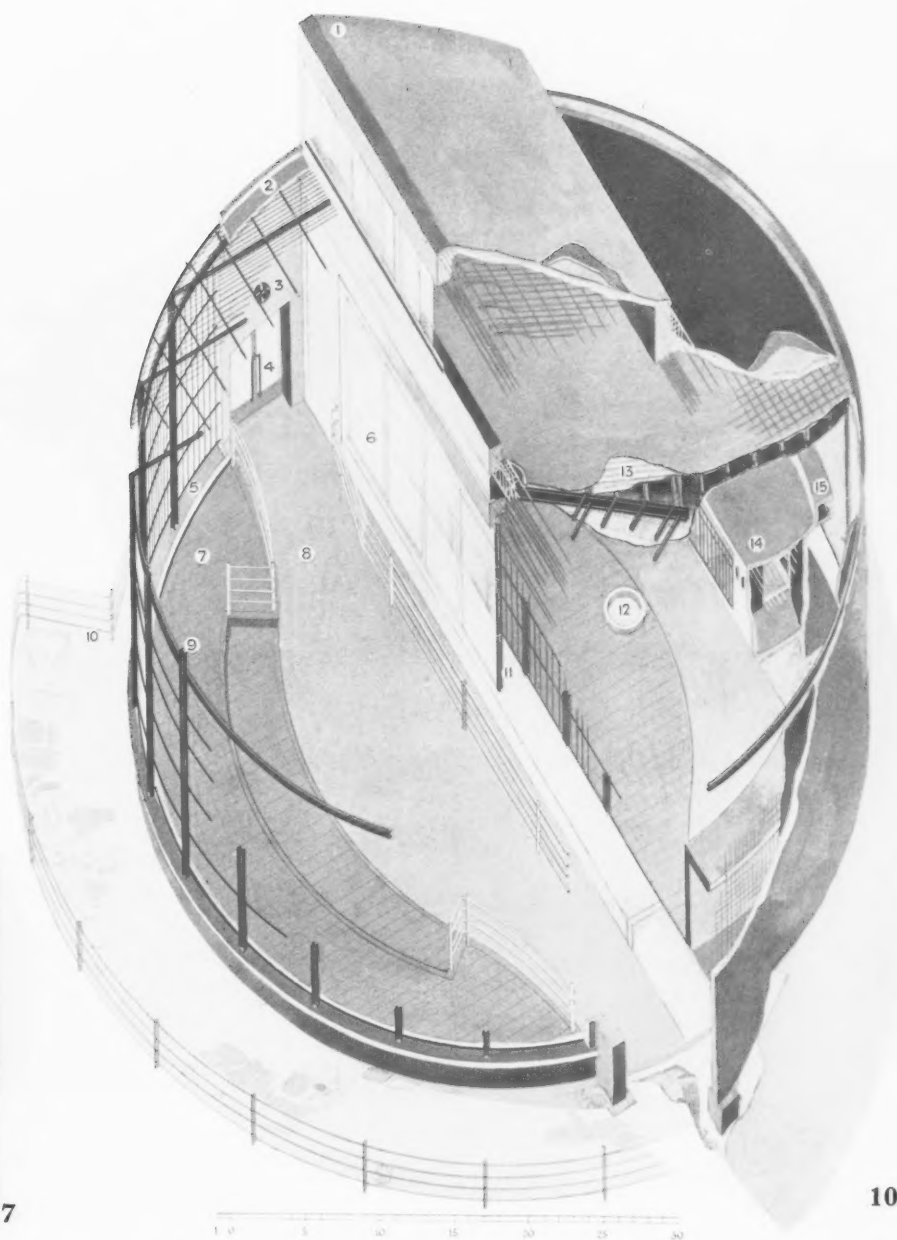
4. Looking from the north-west. 5. From the north-east. 6. A diagram showing the circulation of the public in and around the Gorilla House in winter and in summer. There are six currents of circulation, namely, from the east, and from the west into the House, to the restaurant from the west, to the restaurant from the east from behind the beaver pond, around the south side of the Gorilla House in summer, and an exit in winter from the east side. A bird's-eye view of a model of the building is illustrated on the cover of this issue.



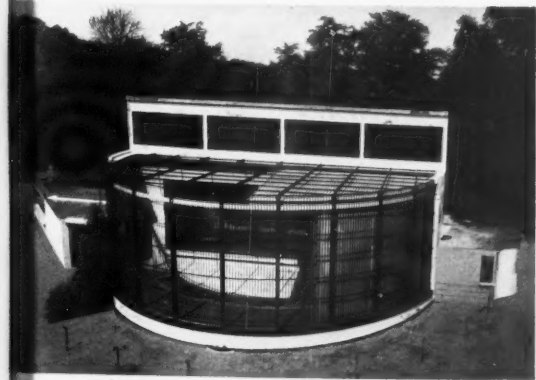
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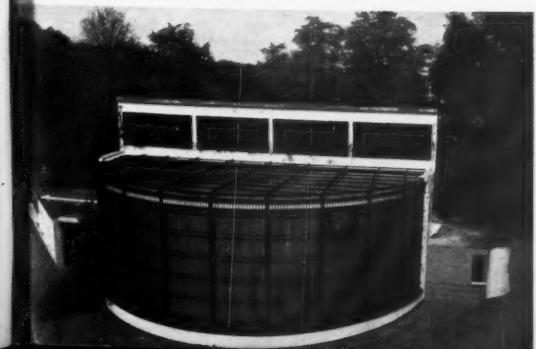
# THE NEW GORILLA HOUSE



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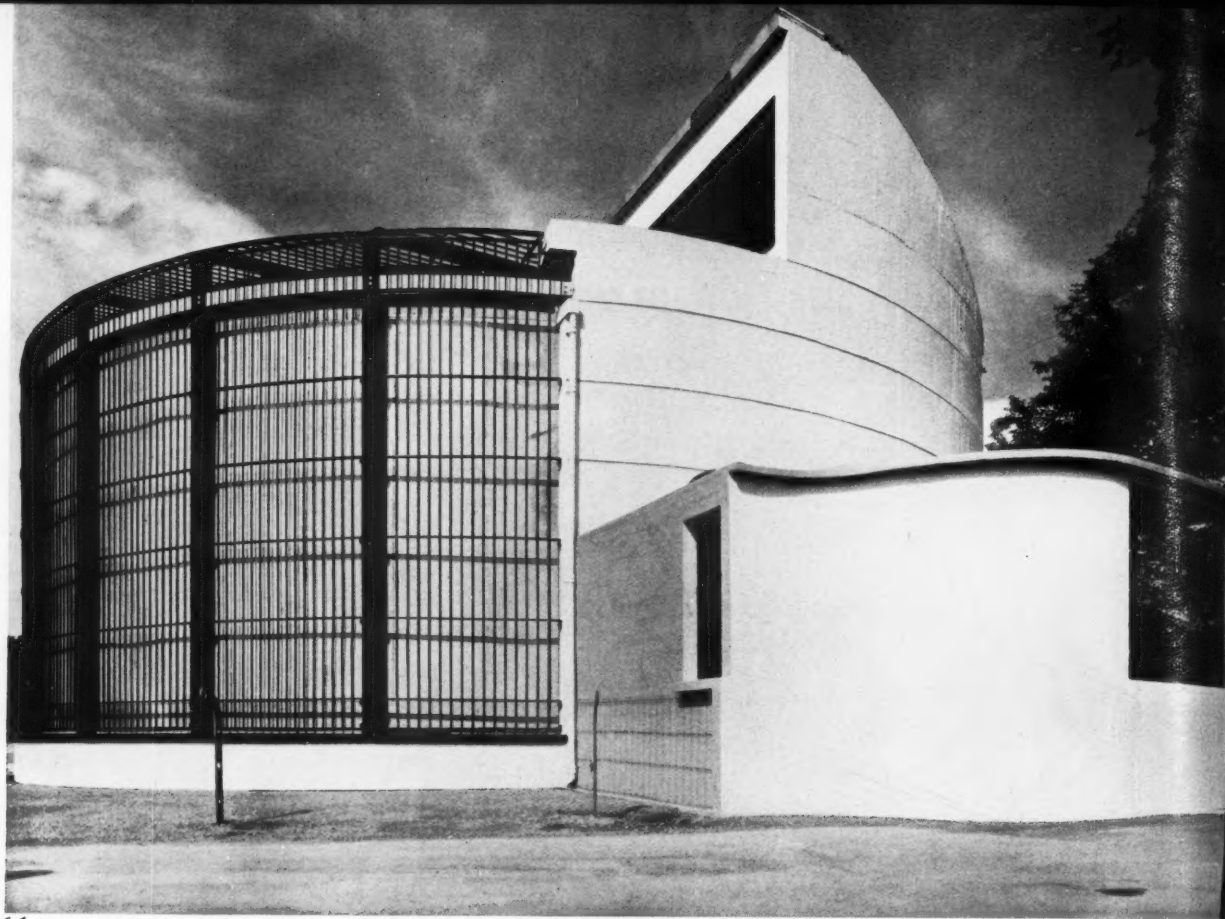


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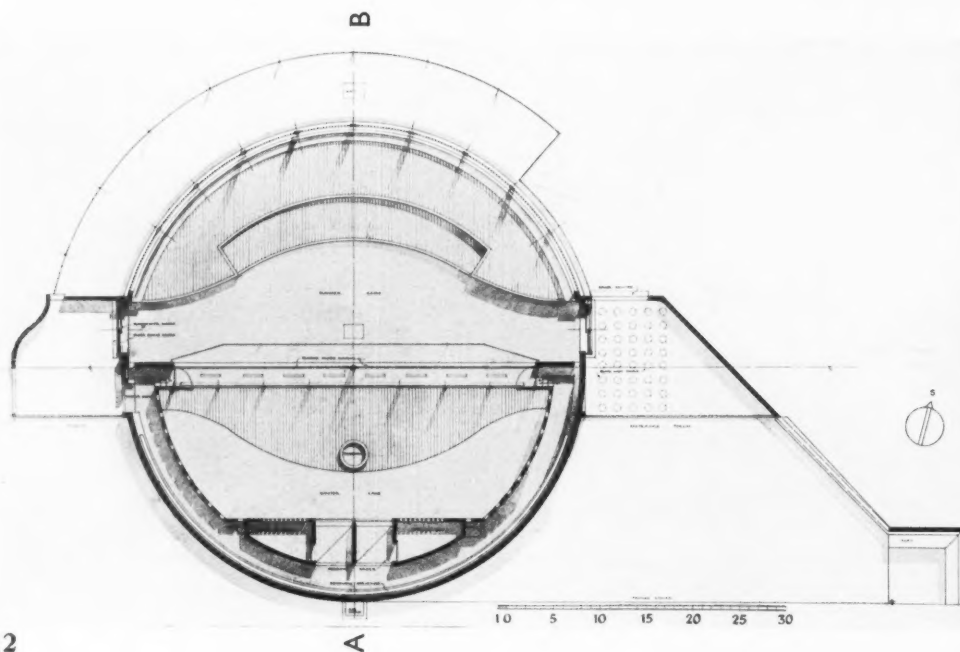
The Gorilla House is constructed of reinforced concrete; the main structure consists of a semicircular reinforced wall four inches thick, finished externally by spray painting directly on to the concrete. Since no rendering has been used, the divisions between the "lifts," where a flush joint is impossible, have been emphasized by forming a deep groove at these levels, thus dividing the curved wall into horizontal bands. Internally the house is finished by a 2½-in. layer of cell concrete, plaster and paint. Cell concrete, a proprietary material, is made of fine sand, cement, and a frothy liquid which forms closed bubbles in the concrete, and makes it light, porous and highly insulating. The roof is of reinforced concrete, insulated with cork, and finished with asphalt. The floors are finished partly in teak blocks, and partly in terrazzo consisting of white marble chippings set in blue cement. The teak blocks are to the front of the cage, and since the gorillas prefer this surface they tend to come to the front and are thus more clearly seen. The revolving structure, that converts the summer cage into the public space, pivots centrally upon ball bearings on a solid steel column, and is supported at its outer edge by fifteen rollers moving along a steel channel running completely round the top of the building, while the wall hangs from this roof. The revolving wall and roof are built upon a light steel and wood framework, and are lined internally with insulating board faced with plywood. The external covering of the wall is of metal faced plywood, and the roof of a bituminous felt on tongued and grooved boarding. The caging is of solid ¾-in. steel bars at 4-in. centres, divided horizontally by steel flats. Considerable solidity is necessary here, since full-grown gorillas are stronger for their size than any other animal. Doors and windows throughout are of steel, and the glass screens are of ¼-in. polished plate glass, sliding on an overhead Coburn track. Steel sliding doors protect the ordinary doors from the gorillas during summer.

7, 8 and 9. Three positions of the revolving structure, e.g., open, half open, and shut. 10. Axonometric drawing showing the construction. The key to the details is as follows:—

1. Clerestory. 2. Hood to spur wall. 3. Extraction fans. 4. Double swing doors. 5. Apron wall to S.C. 6. Sliding glass panels. 7. Wood block flooring. 8. Blue granolithic. 9. Caging standards. 10. Public railing. 11. Central 4-in. column. 12. Bubbling fountain. 13. Revolving structure. 14. Sleeping boxes. 15. Inlet air duct.



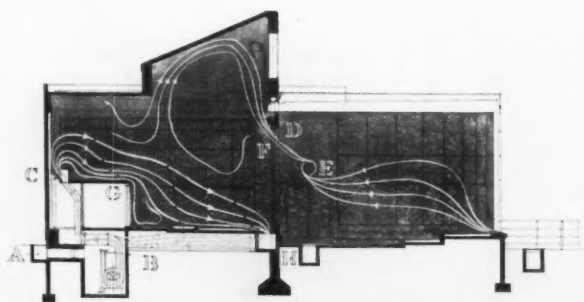
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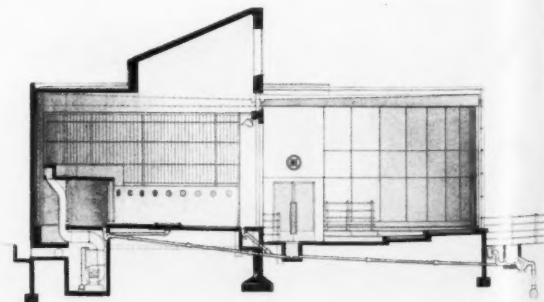
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When the summer cage is enclosed, the gorillas occupy the northern semicircular half of the house which is lit by south facing clerestory windows. This provides a good view for the public, who are unlit, and thus get a "stage" view of the animals without seeing their own reflections. The windows are provided with blinds which can darken the cage, so that the tropical conditions natural to gorillas of twelve hours darkness and twelve hours light may be reproduced.

The gorillas sleep each in a separate box, entered by way of the feeding cages, which have gates both on to the cage and into the keeper's passage behind. Thus they may be lured into their sleeping boxes by the temptation of food, rather than driven in by force, which would in any case be difficult in the case of animals so large and formidable. The keeper's passage runs round the back of the winter cage, and its cantilevered roof provides a ledge on which the animals may sit. At the back of the keeper's passage is the space that the revolving structure occupies during summer. The passage is lit by round pavement lights set in the wall, and the sleeping boxes are ventilated by narrow slits.



13



14

# THE NEW GORILLA HOUSE

In the centre of the floor of the winter cage there is a small basin and fountain operated by a brass knob in the floor. The manipulation of this knob is left to the gorillas, whose intelligence should soon teach them how to obtain water when they need it. There is also a control switch in the passage.

The public are separated by the glass screens from the animals, but there are gauze panels fitted above these, so that the cries of the gorillas and the sounds they make by beating on their chests may be clearly heard.

The summer cage has to provide accommodation both for the gorillas in summer and for the public in winter, and is accordingly fitted with raised steps to enable the public to get a better view of the animals and, during the other half of the year, to allow the gorillas to disport themselves on a variety of levels without getting out of sight behind the low wall.

Gorillas, being delicate animals in spite of their great strength, the conditions under which they live must be reproduced to some extent. This necessitates a moist steamy atmosphere of a constant temperature of about 75° F.

That Congo conditions may be recreated, a heating and ventilating plant has been put beneath the sleeping boxes. The necessary air is drawn in and cleaned through flannel filters, is humidified and heated to the required extent, is driven through concrete ducts, and is extracted through other ducts. At each complete circulation of air, 90 per cent. is reconditioned, and 10 per cent. is fresh. Complete changes of air can be made without any interchange between the cage and the public part of the building, thus avoiding all risk of infection. The public hall is ventilated by means of extract fans above the doors, the air entering through a gap below the revolving structure, so designed as to prevent noticeable draught.

Further heating arrangements are panel heaters in the roof of the sleeping boxes, which also heat the ledge above it; and incandescent electric lamps at the front of the cage, but out of the sight of the public. Both these heating contrivances tend to draw the animals well into view.

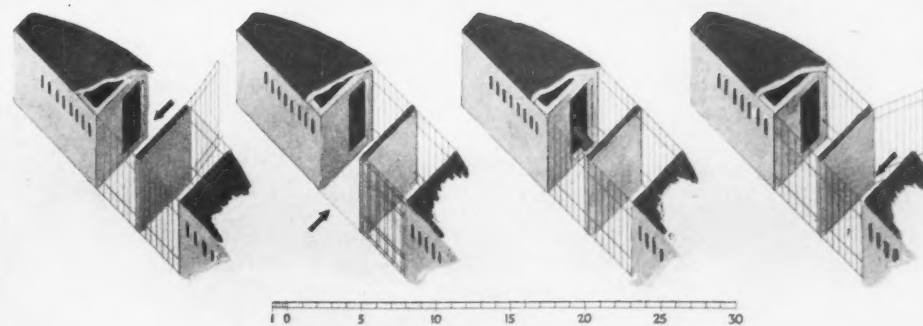
Electric tubular heating beneath the glass screens warm the glass and prevent condensation when the temperature is different on either side.



17



15



11. The House from the south-east. 12. The plan. 13. North-south section on line A—B of plan showing air current distribution. 14. The same section through winter and summer cages taken on the line A—B of the plan. 15. An interior view of the winter cage. 16. Axonometric details of the successive operations of feeding the gorillas and of isolating them at night in their sleeping boxes.

*First stage.*—Keeper puts food in feeding cage, entering by gate from keeper's passage. The doors to sleeping box and winter cage are closed. *Second Stage.*—Keeper opens gate to winter cage after going to keeper's corridor and closing his own gate after him. Gorilla then enters feeding cage. *Third stage.*—Gorilla eats the food during which the keeper closes the door between the winter cage and the feeding cage, and opens the sleeping box door. Gorilla enters. *Fourth stage.*—Keeper shuts the door to the sleeping box for the night. This is done from the passage. All gates are now shut and the keeper repeats the process for the second gorilla.

17. An interior view of the revolving structure when open.

16

245





## A Small-Town Concert Hall

ARCHITECT: SVEN MARKELIUS

THE Concert Hall at Helsingborg, Sweden, lies within an area which obtains its atmosphere from the broad avenue of Drottninggatan, the main street of the town, and the open spaces leading on to St. Jorgen's Place and Oresund's Park. The broad avenue of Halsovagen breaks through the park, whose undulations and rich verdure are outstanding features of the ridge which crosses the town and runs parallel with the Straits of Oresund. Halsovagen is one of the main thoroughfares running in the direction of the lower part of the town, towards Drottninggatan, and towards the harbour which has been developed along the Straits. From Halsovagen and Oresund's Park the eye seeks beyond to the harbour and the silhouettes of the ships, over the Straits towards Denmark.

On the ground floor the main building houses a smaller hall with a seating capacity for 525 people; this will be devoted to chamber music, lectures, etc., and at the moment is being used as a cinema; in addition there are cloakrooms and a vestibule. Over this small hall is the big concert hall, seating 1,000 people. The southern part of the building has six different stories containing cloakrooms and foyers for the musicians, rooms for the directors, soloists

and conductors, rehearsing hall, and residential quarters for the commissionaires and mechanics.

In the entrance hall are vestibule, cloakroom and staircases to the big concert hall—which can also be used as a banqueting hall—and, on the lower ground floor, a restaurant. The kitchen for the latter is situated on the first floor of the main building, i.e., on a level between the restaurant on the one side and the terraces of the entrance hall and the big concert hall on the other. For the service of large banquets there is a second kitchen, situated in the southern part of the main building, with easy communication to the hall. In the corridor between the two kitchens are a series of storerooms and refrigerators.

Looking from the Avenue Drottninggatan, there is an open view into the main entrance through the glass doors and the plate glass wall above the canopy. From the sides of the vestibule the staircases lead up to the cloakrooms, which are built in a semicircle and connected with a platform on a high level. Below this landing it is possible to look down into the restaurant and the dance floor, and above the aspect opens out towards the broad main staircase and the foyer. The cloakrooms are divided into

# H e l s i n g b o r g

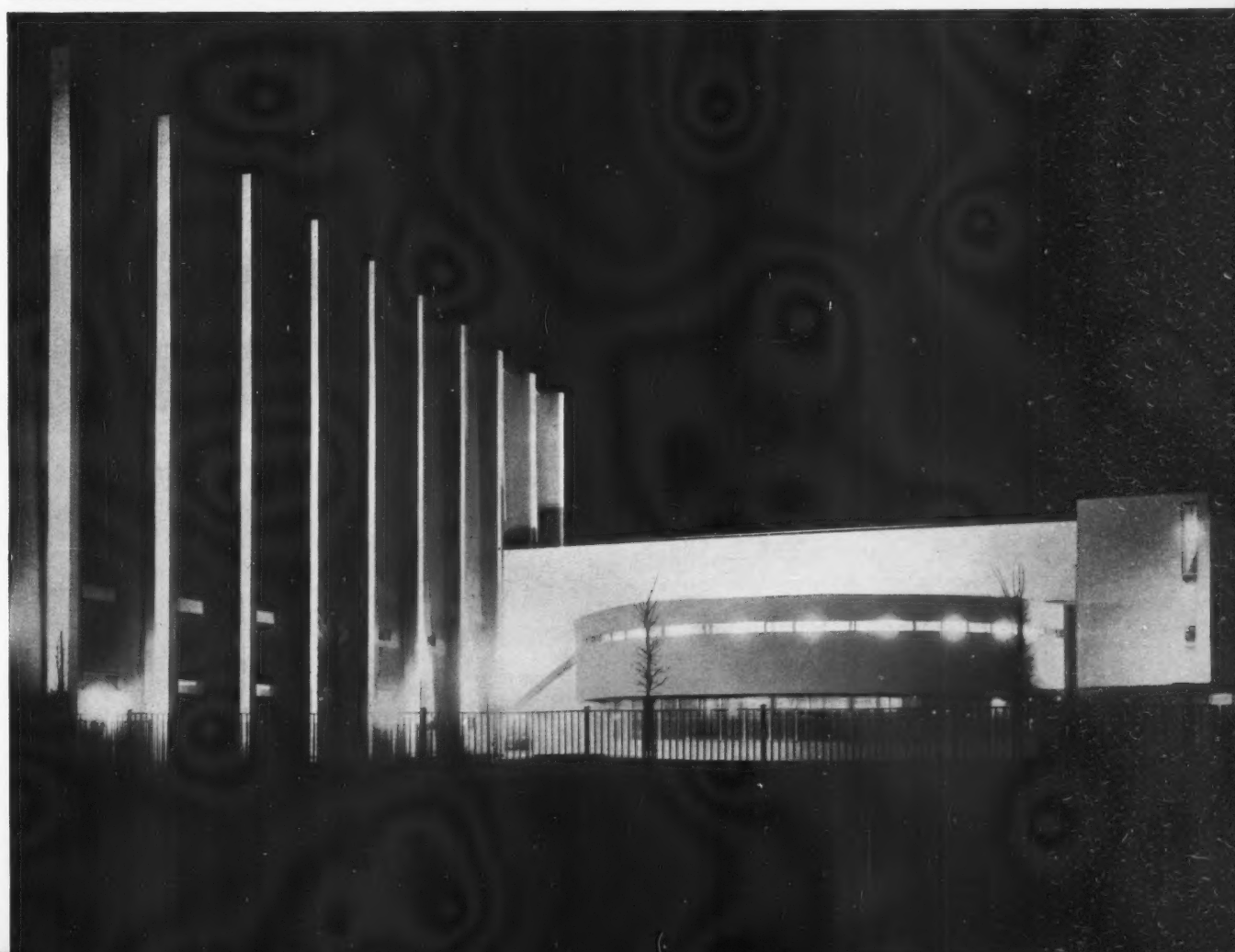
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The figure on the left represents the population of the Swedish town of Helsingborg. Here are the populations of a few English towns of about the same size which have not as yet built modern concert halls.

Burton-upon-Trent - 48,909  
Bury - 56,426  
Crewe - 46,477  
Dewsbury - 54,165

Doncaster - 54,064  
Dudley - 55,804  
Exeter - 59,608  
Gloucester - 51,330

Mansfield - 47,550  
Nuneaton - 46,561  
Wakefield - 55,045  
Watford - 54,460



*Top*, exterior as seen from the Avenue Drottninggatan. *Right*. The entrance hall flood-lighted.





The big hall in the Concert Hall at Helsingborg, looking towards the podium.

sections under different letters\* and are situated along the outer wall, whilst the inner wall is completely covered with mirrors. The view from the foyer through the single plate glass wall is towards the Straits and the sea.

The big concert hall is designed as a single rising auditorium with only two low boxes. When it is anticipated that the audience will be small the higher portion can be shut off by an easily manipulated curtain. In this way the hall assumes a more intimate character, seating 650 people.

When the hall is to be used for banquets a raised floor is erected. This consists of numbered standard elements which can be put together in 2½ hours. The structure consists of columns and beams of timber on which is laid square parquet flooring 1 in. thick tongued grooved for connecting together.

In the design of the hall special consideration has been given to the acoustics. The most obvious expression for this is the large sound reflector over the podium. This reflector is divided into seven different segments, the form and direction of which have been decided upon from the

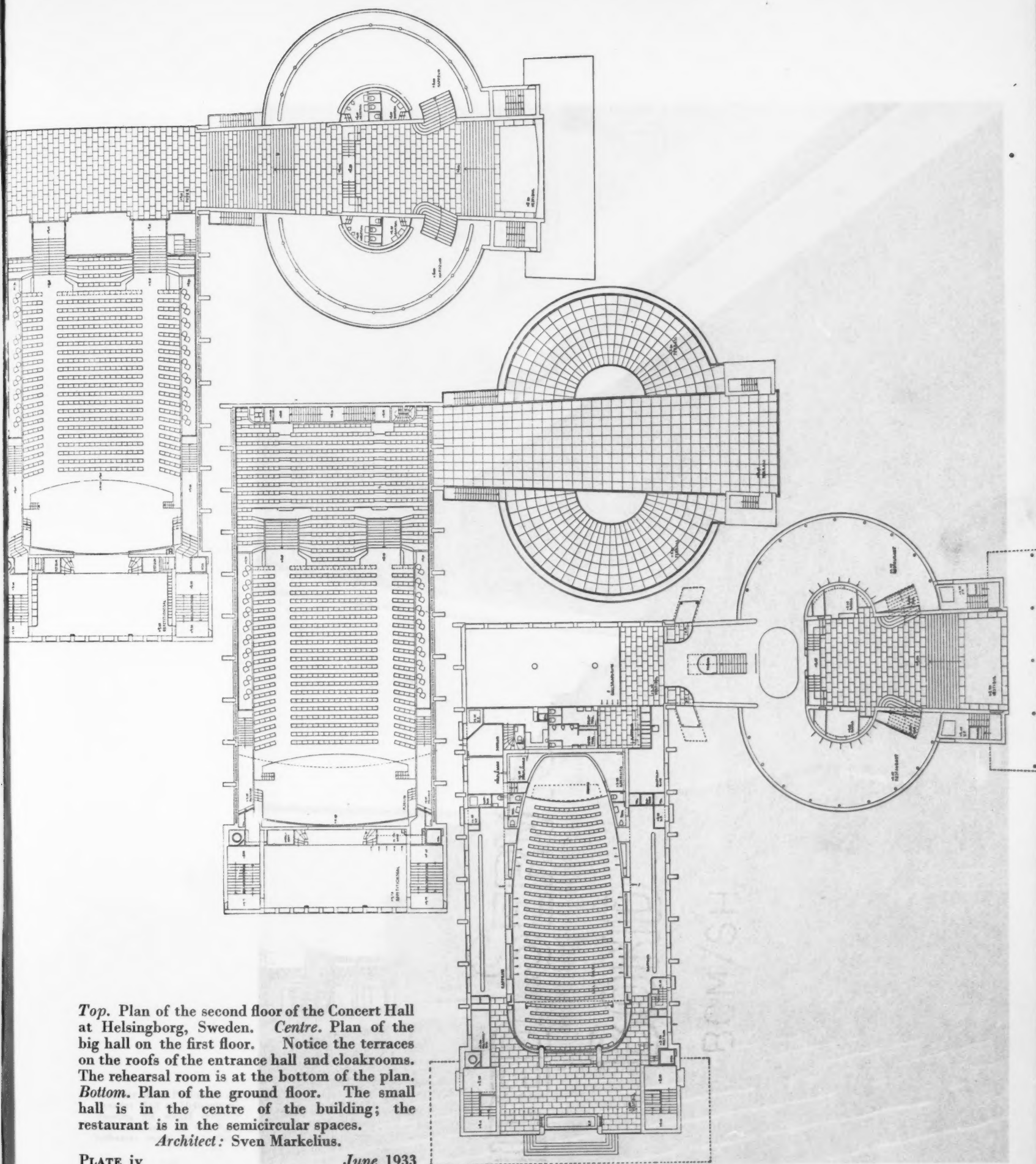
\* In Sweden people do not attend concerts or theatres with their outdoor clothes on. The cloakroom question is therefore important.

estimates which have been made with reference to the deflection of the sound to various parts of the hall, taking into account a suitable division of the sound energy in relation to the distance between the source of the sound and the seats. This division is made in such a way that the reflected sound strengthens the direct sound so that the seats far away, where the direct sound is comparatively weak, obtain a greater part of the reflected sound, and the seats closer to the podium where the direct sound is stronger, a lesser part of the reflected sound. The calculations for this were prepared by Monsieur Gustave Lyon of Paris, well known as the designer of Salle Pleyel. The principle to ensure effective acoustics by utilizing the sound energy with reflecting surfaces has been used in both cases, but the design of the details varies on account of the different conditions; for instance Salle Pleyel is very much larger than the Helsingborg Concert Hall and has two balconies. To convey to these balconies a sufficient quantity of reflected sound, large areas of the ceiling have been used, so much larger as the sound energy is weakened on account of the great distance between the ceiling and the orchestra. The utilization of the ceiling



The big hall looking towards the auditorium.



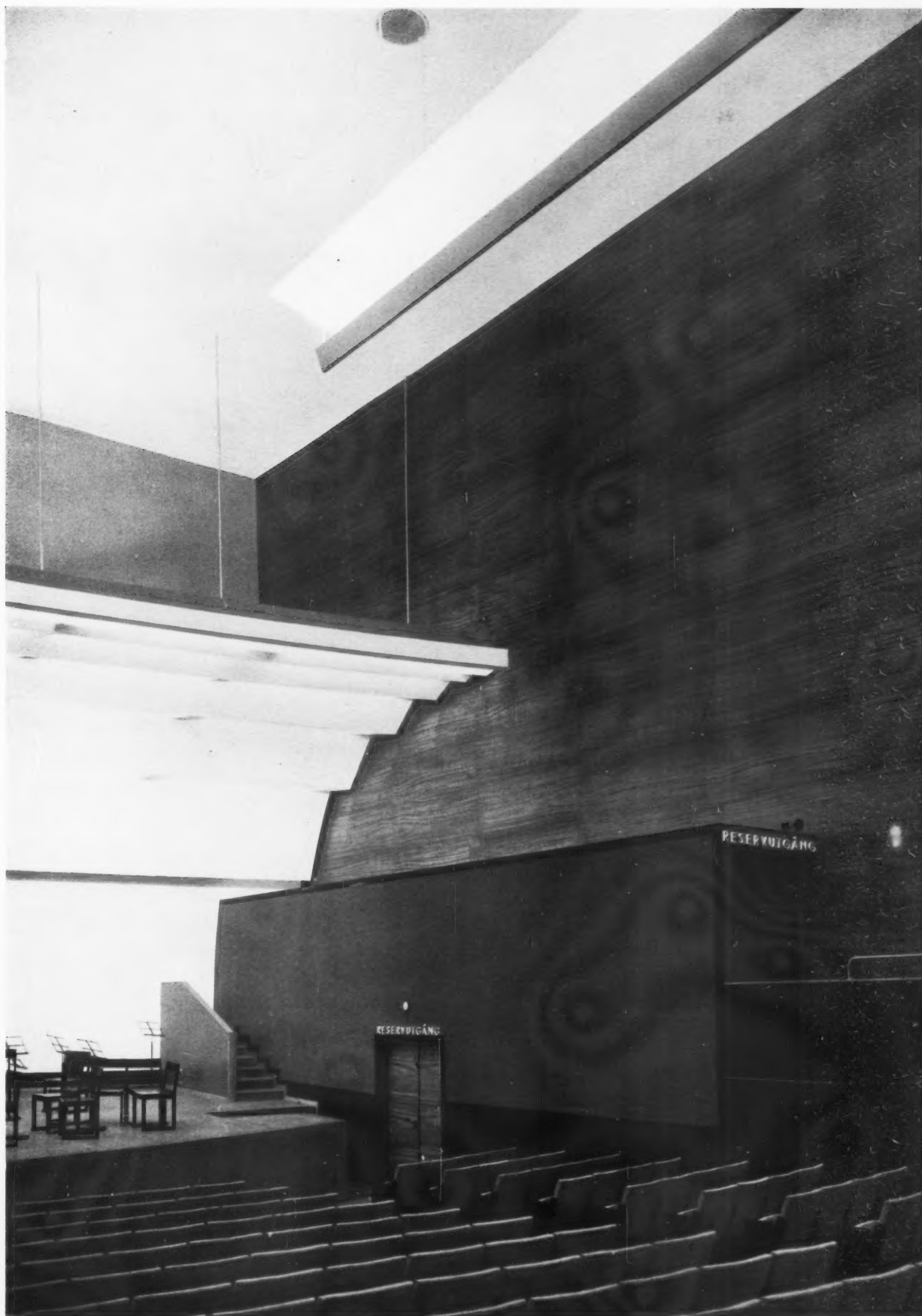


*Top.* Plan of the second floor of the Concert Hall at Helsingborg, Sweden. *Centre.* Plan of the big hall on the first floor. Notice the terraces on the roofs of the entrance hall and cloakrooms. The rehearsal room is at the bottom of the plan. *Bottom.* Plan of the ground floor. The small hall is in the centre of the building; the restaurant is in the semicircular spaces.

*Architect:* Sven Markelius.

VERBODEN TOEGANG

A corner of the Podium in the Concert Hall at Helsingborg, showing the sound reflector and also one of the light reflectors near the ceiling.







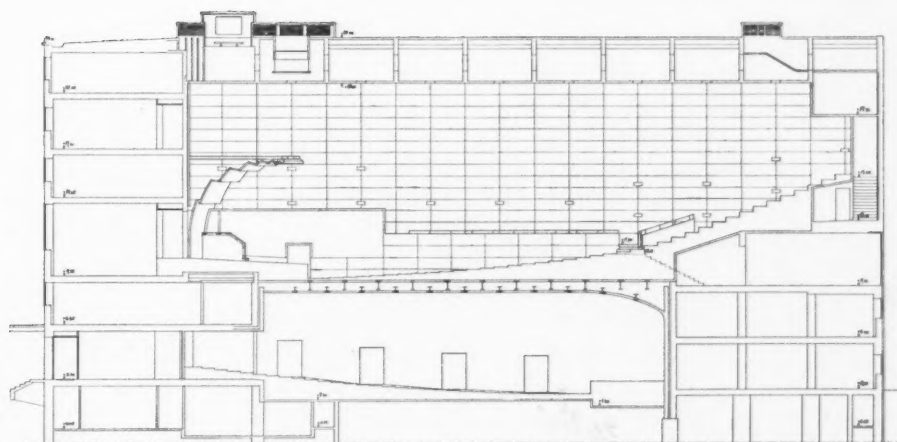
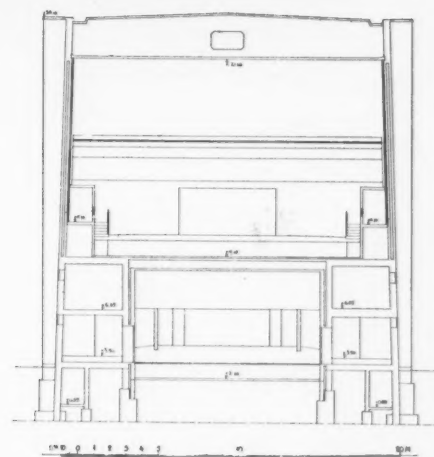
has had the natural consequence that its surfaces must be used as active reflectors of sound, and these conditions have given the ceiling of the Salle Pleyel a very characteristic shape, forming as it does a curve which is a direct continuation of the wall at the back of the podium. In the Concert Hall at Helsingborg there are no balconies and the reflection of the sound to the seats is effected with the help of reflectors placed at a small distance from the source of the sound; consequently there is a more effective utilization of the sound energy, which, as a matter of fact, decreases in proportion to the square of the distance. On this account, the sound reflectors have been given much smaller dimensions and they have not had any influence on the design of the hall, which is a rectangle with a horizontal ceiling. This arrangement has had the additional advantage of lowering cost by making possible the standardization of the constructive elements. On account of the reasonable dimensions of the hall there are no drawbacks in the form of echoes, which, for a hall of the size of Salle Pleyel, would have been caused if certain arrangements had not been made for the absorption of the sound. The sound reflector at Helsingborg is an instrument in itself, the shape and dimensions of which are exactly those corresponding to the most suitable directions and the quantities necessary for obtaining the best result. Contrary to that in the Salle Pleyel, the system installed here has been the use of the lower part of the reflector for reflecting the sound to the seats farthest away, and the top part for reflecting the sound to the nearest seats. This is a logical consequence of the lower portion of the reflector being situated closer to the source of the sound than the upper part, and consequently reflecting more sound energy per square unit. The popular opinion that an acoustic interior must have the form of a shell, as is the case with Salle Pleyel, is thus dispensed with, even from a theoretical point of view. In actual practice the acoustic result obtained at Helsingborg has not in any way contradicted this theory. The space above the reflector will later on

hold the machinery of a large concert organ, the pipes of which will be visible. So that the conductor shall receive the direct sound of the organ, openings have been made between the different segments of the reflector, by which the reflector is also indirectly lighted. The back wall of the hall and the lower walls along the sides have been made sound absorbing by being covered with  $\frac{1}{2}$ -in. thick free-hung rug, over which has been stretched a cover of brown jute cloth.

The lighting is indirect from two double reflectors all along the hall, made of fibre boards and mounted on wood. In the top reflector the lamps light the ceiling, whilst the lower reflector lights the underside of the one above it. The lamps can easily be changed as it is possible to walk upon the top reflector, and access is available from the loft through the holes for ventilation.

The main building is constructed as a skeleton with a structure of heavily reinforced concrete frames, of which the top corners are stiffened and the legs rest on the granite of the foundation without any crossbeams. The design of these frames, with their stiff upper corners, has resulted in the legs of the frames tapering downwards, the striking effect of which has been allowed to show in the façades to give the hall quite plain inner wall surfaces. The space between these concrete frames is closed by two walls of bricks, 6 in. apart, the cavity being filled with lean concrete of low weight. The small hall has been designed as a system quite separate from the main building, whereby any transmission of sound through the structure has been avoided. The semicircular parts of the entrance hall rest on steel pillars, whilst the peripheral parts of the cloak-rooms are designed as free bearing cantilevers.

With the exception of the blocks, which have been concreted against planed shuttering, the whole building is plastered by the cement gun process and the colour is natural broken white. Windows and doors are of steel and the columns which carry the roof of the entrance hall are of reinforced concrete covered with polished stainless steel.



On the opposite page. The landing looking down to the restaurant, and up to the grand staircase and foyer in the Concert Hall at Helsingborg. Above. The foyer. Centre. Cross section of the main building. Note the concrete frame with tapering legs and inclining interior walls. Right. Longitudinal section of main building, showing the big hall above and small hall below.



# FASHION AND TRADITION:



*Left.*—A lady's bedroom suite in English sycamore. The walls are in silver colour wood. Designed and made by Betty Joel. This is a modern bedroom for the rich. Illustration from *Design in the Home*.  
*Above.*—An iron bedstead, 1½ in. tubes, from the new catalogue of The Army and Navy Co-operative Society. This, fitted with a mattress similar to that on the bed in the picture on the left, would be equally comfortable as the rich woman's bed. They both perform the same function. Fashion or tradition? See the review below.



*Left.*—A hand looking-glass from the current general catalogue of The Army and Navy Co-operative Society, and costing a few shillings. Notice the convenient shapes of both glass and handle. *Right.*—A silver niello and ivory toilet set designed and made by H. G. Murphy. Notice the shape of the handle. Fashion or tradition? See the review on the right.

*Below.* A painted dressing-table and stool for a lady's bedroom. For a rich lady's bedroom. Question: Are the sharp angles, the lights and the



curious legs due to fashion or tradition? *Answer:* The rich can afford fashion. These two illustrations are from *Design in the Home*.

DESIGN IN THE HOME. Edited by Noel Carrington, London: Country Life, Ltd. Price 15s. net

It is hard to write about modern furnishing and the equipment of the house and to get hold of the right end of the stick. Mr. Carrington, in his text, at any rate, has got it. Of the photographs he says, "The illustrations do not represent perfection. Even if perfection were to be found and photographed, it would be out of date tomorrow." This does not mean that good design is purely a thing of fashion and that where we have a wardrobe in figured walnut today, we will have one in stainless steel tomorrow, but rather that clothes in a few years may be made of some material that does not require a wardrobe to conserve it, but instead, let us say, a water tank or a towel rack. Mr. Wells Coates is quoted by Mr. Carrington thus: "He argues that the original meaning of 'furniture' as 'something with which one is provided,' or 'equipment,' is sounder than its present meaning of 'movables,' expressed more clearly in the French *meubles*, as opposed to *immeuble*, i.e., the house itself. He would have us regard furniture as a thing to be used and not to be carried about to the end of our lives and for generations to come. 'Very soon,' he writes, 'it will be considered quite as fantastic to move accompanied by wardrobes, tables and beds, as it would seem today to remove the bath or the heating system.'"

From this the reader may see that the whole question of the equipment of the home is in a constant state of flux with the invention of new materials both for building and for furnishing, and new inventions for cooking, hearing, seeing and



# WHICH IS WHICH?



The heart of the house is the kitchen. Here the professional artist and the interior decorator will have no room to play about with shapes. Omelettes cannot be made in Art Nouveau pans, nor cabbages boiled in Art saucepans. Here, Necessity, with severe hand, has dispensed with the self-conscious artist and

cleaning. One may even carry the uncertainty a step further and say that there is no knowing what the home will be in a few years. Family life may cease to exist; we may all live in blocks of flats and be provided for by a benevolent State.

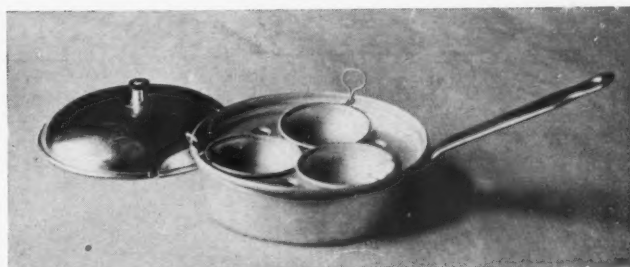
This makes Mr. Carrington's book no more than a survey of present British work—he has confined himself to the Empire—and a useful pointer to what is going to happen in the immediate future. But it is well to bear in mind the almost unimaginable changes that are bound to take place if our present miserable state is to continue, and, while bearing this in mind, to realize that the beauty of objects in the home will depend, not as they did in the eighteenth century, on fashion, but on utility. And Mr. Carrington has wisely taken utility as the criterion for judging the objects mentioned in the text of his book and whatever is "sensible" and "useful" is recommended. Perhaps the most striking illustrated example of the ably expounded general theory of the text is to be found in the contrasted photographs entitled "Two Stages in the Evolution of an Instrument." These show two telephones, the first being the old-fashioned sort with a receiver and mouthpiece as separate entities, the second the latest pattern with the receiver and mouthpiece on one holder. The caption reads, "The first is technically efficient, but the user's convenience has not been studied. The speaker must go to the mouthpiece instead of the mouthpiece coming to the speaker."

The subject of handcraftsmanship and mass production has been touched upon, and since this is a book for the rich by reason of its price, and this price is further justified by the nature of the objects illustrated, handicrafts, of necessity, come into it. But fewer and fewer people can afford the sumptuous interiors with their specially designed carpets and their heavy wooden furniture. The only really original and useful object produced for these surroundings by the twentieth century is the deep armchair. Therefore, I regard the beginning chapters of Mr. Carrington's book on interior design and on furniture, and even on artificial lighting, as of less consequence than his later sections. The chapters on heating and baths, and lavatories, are of greater use, while the pages dealing with the kitchen—the most important and most beautiful room in the modern house—are the most important of all.

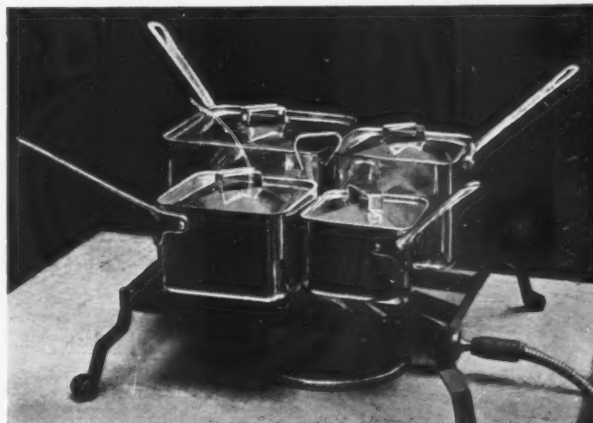
Anyone reading Mr. Carrington's text will feel himself thrilled at the prospect of the illustrations to his sensible remarks. But here he will be doomed to disappointment. In the preface occur the following significant sentences: "... I have aimed at being of some practical assistance to readers. . . I have limited myself to examples of British workmanship, although it was often difficult to find exactly the picture I required within this limitation." I hope this book will be the reason, as it deserves to be, for a widening of the limits by which Mr. Carrington was hindered. As it is, from the 509 illustrations, what emerges? Some cutlery, some cooking utensils, some gas stoves and cookers, a motor car, a telephone and an armchair. Architects, decorators, where is your vortex?

JOHN BETJEMAN.

Fashion has fled to the drawing room and my lady's boudoir. The illustration on the left shows two of the latest types of electric stoves. Tradition.



A steamer for poaching three eggs. Tradition.



Square saucepans to fit close and conserve heat. Tradition. The illustrations on this page are all from *Design in the Home*.

# One Profession on Another

By J. H. A. Sparrow (*Barrister-at-Law*)

THE PROFESSIONS. By A. M. Carr-Saunders and P. A. Wilson.  
Oxford: The Clarendon Press. Price 25s. net.

No profession's work more obviously affects the public at large than does the architect's. None, if ill done, leaves a more enduring testimony of its failure. However bitter is the popular complaint against the injustices of the law and the delays and expenses of litigation, it is generally admitted that the standard of work at the Bar gives satisfaction, and complaints about the state of medicine usually admit the professional skill and diligence of those who practise it. With architecture the reverse is the case. No one doubts that architectural technique has reached a high pitch of perfection, that beauty is within the architect's reach, and opportunities for its production occur every day. Yet achievement itself falls lamentably short, although the architect's work is subjected, as that of the lawyer or the doctor is not, to the perpetual scrutiny and criticism of the public.

Why should this be so? How can it be altered? This book on *The Professions* helps a little towards answering these questions.

The architect has the misfortune of being by nature epicene. He is at once an artist and a professional man. Even his artistic aim is twofold: he should aim at producing serviceable buildings that are beautiful and beautiful buildings that are serviceable. The deficiencies that have, in fact, usually to be deplored are æsthetic. The "olde-worlde" is called in to redress the balance of the new. This is a state of affairs which can never be remedied by a machinery—and it is the only machinery which the profession as such can command—of examination, certification, and registration. By certifying his technical proficiency or experience, by admitting him as Associate or Fellow of an Institute, by registering him, in short, as a fully qualified professional man, you cannot make an architect an artist. By prescribing the terms in which members of your Association may enter for professional competitions, and (as the Institute does) the minimum terms of their remuneration, you may ensure them a professional status denied to non-members. But by ensuring (and this is really the aim of such Associations) that only an architect with such a status and such qualifications is likely to secure considerable work, you cannot exercise any control over the quality of the work that he will produce. Into medicine or the law the æsthetic element hardly enters: the doctor or the lawyer may take pride or pleasure in his style, but the success of his work depends upon a practical competence which is only one element in the architect's equipment.

All this may be obvious, but it is not therefore unimportant. Owing to disregard of it, it seems that much of the organization of the profession has been misdirected. Ever since the inception of the R.I.B.A. in 1866 the history of the profession (as the brief survey in this book makes clear) has been that of a succession of squabbles, intrigues, amalgamations, secessions, and *impasses*, within the Institute and between it and rival associations, on the subject of registration. The crux of the dissension has (it appears) been simply this: that the Institute was anxious to preserve from dilution the prestige attaching to its Fellows and Associates, while the Society of Architects and kindred bodies have been anxious, by enforcing registration, to secure an

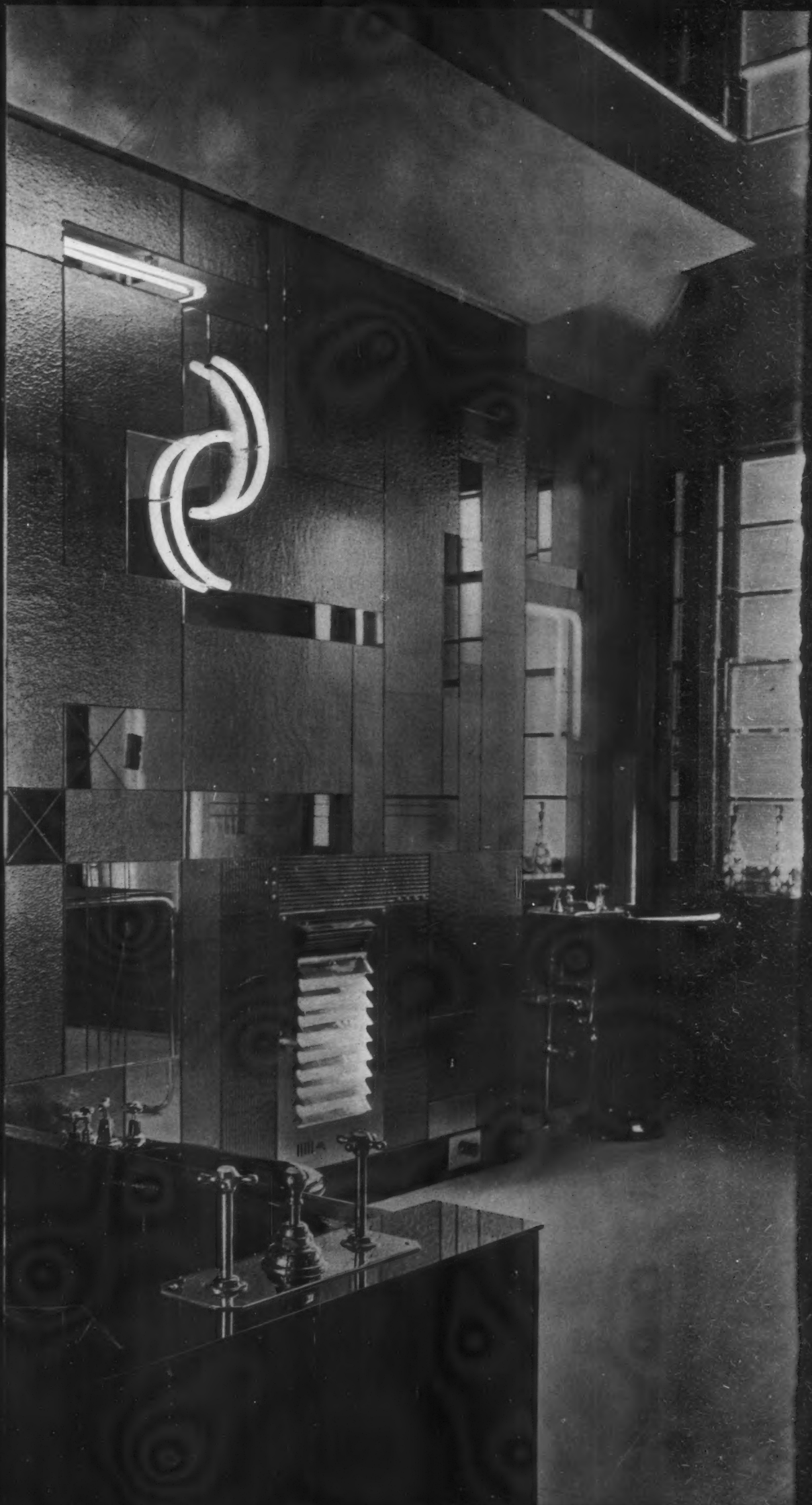
equal footing. After half a century of warfare a conclusion was reached by the passing of the Architects (Registration) Act, 1931, which set up a Council (on which the R.I.B.A. and the other leading associations are represented), an examining Board, and a Discipline Committee. Briefly, the effect of it is that unless an architect, having passed the prescribed examinations, gets himself placed on the Council's register, he is debarred from calling himself a Registered Architect. What advantage he will gain by so describing himself is not clear. He cannot, any more than he could before the Act, prevent his unregistered rival from practising; his qualification will not (it seems safe to predict) supplant in prestige the still-existing older denominations in his profession; finally, there is no guarantee in the nature of things that the work of a Registered Architect will be better than that of one who is merely an architect. Whether the event has satisfied the supporters or the opponents of registration may be doubted; to the outsider this long drawn out division seems, since it has been solely concerned in effect with privilege and monopoly, degrading, and since it has failed to solve even those problems, futile.

Realizing that no amount of organization within the profession can affect the quality of building actually produced, and that all attempts to control the practice of so far-flung and heterogeneous a body as the architects of Great Britain (even if an attempt is made to reach them through their local associations) must be vain, the leading architectural bodies might well have pursued an entirely different course. They might have left to such professions as the Bar, where all the conditions of practice conspire to make control easy, and where such control has a direct effect upon the work done, the enforcement of strict rules of professional practice and status, and have turned their energies to educating in architectural matters the public at large who are their critics, and that smaller section of the public who are their employers. For if, as is certainly the case, it is public apathy that is primarily to blame for the deficiencies of public architecture, architects themselves might have done more, by exerting their influence on outside bodies instead of on internal dissension, to educate the general taste. Indeed, the survey in this book would have been more interesting, and perhaps have given grounds for better hope and a kinder judgment, if it had said more about the relations between a practising architect and the private persons and public bodies who employ him.

## Books Received

- A HISTORY OF IVER. By W. H. Ward and K. S. Block. Secker. 10/6.  
CANTERBURY CATHEDRAL. By M. A. Babington. Dent and Sons, Ltd. 2/6.  
BASEL, BERNE AND ZURICH. By M. D. Hottinger. Dent and Sons, Ltd. 5/6.  
TOWN AND COUNTRY PLANNING. By Professor Patrick Abercrombie. Thornton Butterworth. 2/6.  
CATALOGUE OF THE GREEK ETRUSCAN AND ROMAN PAINTINGS AND MOSAICS IN THE BRITISH MUSEUM. 1933. Published by the British Museum.  
ARCHITECTURE IN THE BALANCE. By Frederic Towndrow. Chatto and Windus. 7/6.  
THE ARCHITECTURE OF A NEW ERA. By R. A. Duncan. Denis Archer. 7/6.  
THE CONDITION OF THE WORKING CLASS IN BRITAIN. By Allen Hutt. Martin Lawrence. 6/-.  
LOCAL GOVERNMENT IN MANY LANDS. By G. Montagu Harris. P. S. King. 15/-.  
SHAKESPEARE MEMORIAL THEATRE. By G. A. Jellicoe. Ernest Benn. 63/-.  
ARTISTS AT WORK. Edited by Stanley Casson. Harrap. 5/-.  
THE GARDEN OF TO-DAY. By H. Avray Tipping. Hopkinson. 7/6.







OVERLEAF, AT CLOSE RANGE

# A FAMOUS DANCER'S BATHROOM DESIGNED BY PAUL NASH

This bathroom at No. 35, Wimpole Street, London, the residence of Edward James, Esq., was built by him for his wife, Miss Tilly Losch. The room is particularly interesting because it represents a departure from the normal use of polished glass for wall lining. The effect is produced by using  $\frac{1}{4}$  inch thick Stippled Cathedral glass, which is pure white, but treated with "alloy" silvering which produces a deep metallic purple colour. (The great advantage of using glass having a comparatively rough surface is that condensation is practically invisible, and at the same time the work of cleaning the glass is very much easier.) The depth of colour over the greater area is relieved by panels of peach plate mirror which give clear, warm reflections. Emphasis is given to the doors, and surround to the electric radiator, by the use of the Reeded glass alloy silvered. The sanitary fittings are in black glazed earthenware, and all the metal-work is chromium plated. The mirrors on the ceiling above the basin and over the entrance door are in ordinary white silvered plate. The materials used, to which the letters on the key sketch refer, are as follows:

(a)  $\frac{1}{4}$ " Cathedral Stippled alloy silvered. (b) Pink Plate Mirror. (c) White Plate Mirror. (d) White Polished Plate, Alloy Silvered. (e) Pink Mirror, Brilliant Cut. (f) Reeded Glass Clear (As window glazing). (g) Reeded Glass Alloy Silvered. (h) Black Polished Opal. (i) Lighting Tubes. (k) Pink Rubber floor. (l) Ceiling and Coving painted in metallic colour to match floor and pink mirrors. (m) White mirror suspended from the ceiling.

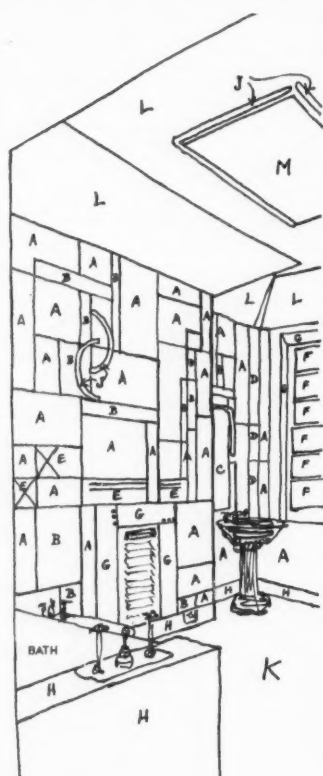
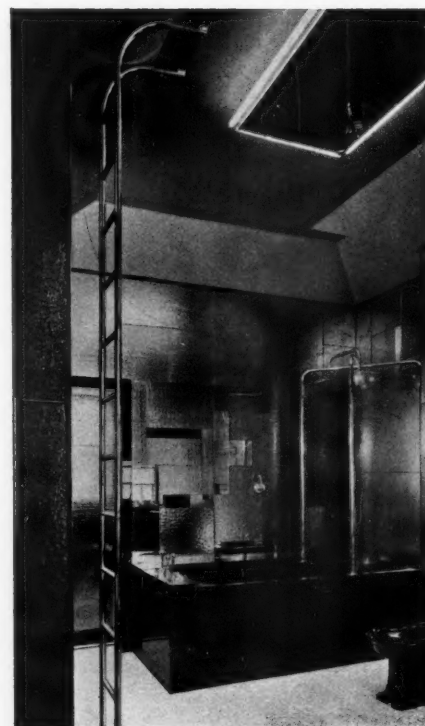
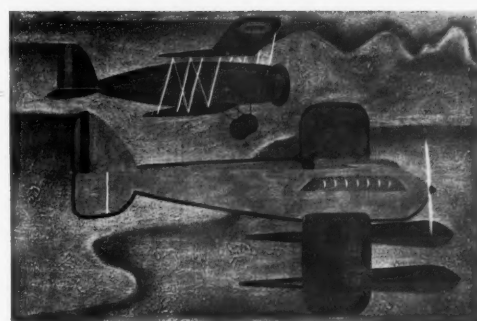


PLATE V

June 1933





## FRESCOES

JOHN ARMSTRONG has prepared eight gesso panels, four of which are reproduced here, for the restaurant of Shell-Mex House. Their theme is of the sort made popular in the past by *Punch* and C. B. Cochran—a historical review of methods of locomotion through the ages, from Icarus and slave-propelled galleys to modern aeroplanes and steamboats. The subjects are formalized rather in the manner of children's drawings, and are mostly such as children are specially fond of depicting—a bellying sail, the upper curves of horses' necks, the ventilators on a steamer, etc. As a more adult



BY JOHN ARMSTRONG

attraction, the backgrounds are variegated with romantic or atmospheric lines and curves.

This uniting of different sorts of popular appeal reminds one of Noel Coward's revue, *Words and Music*, in which the songs, "A Younger Generation" and "Twentieth Century Blues," were each artfully designed to please a different section of the public.

Mr. Armstrong's similarly diverse aims tend slightly to thwart one another. Thus, the child-like manner is far less effective in these panels, where it is incompatible with the necessary slickness, than it is in the pictures of George Wallis, some of whose work has been exhibited by the Seven and Five Society. The atmospheric, on the other hand, having to submit to a sort of nursery discipline, seem feeble in comparison with those of André Masson. But it is clear that these limitations are the result of the requirements of a place of popular resort, which are very different from those of a picture gallery or private owner. And Mr. Armstrong is

to be congratulated on the way in which he has answered these requirements. The make-up of this page gives a suggestion of the setting of red-and-white tiles in which the panels are to be placed. The panels' bright reds and blues and clear lines are particularly well suited to an artificially-lighted restaurant in a modern building. Moreover, although dealing mostly with the subject of violent movement, they have a pleasantly reposeful as well as gay effect, the reposefulness being enhanced by the flattened wheels of the motor cars and the squat bulkiness of the aeroplanes. The restaurant walls of one of the railway stations in Basel have been decorated for some years with frescoes which, though not having the merit of Mr. Armstrong's panels, give a similar effect of light up-to-dateness, that consorts well with food. It is a pity that more work of this sort is not done, and that painters as good as Mr. Armstrong are not more often employed on it. The photographs were prepared by Maurice Beck.

NORMAN CAMERON.

# A Free Commentary

By Junius

THE Smoke Abatement Society is sending out as a reminder of the needs of its exchequer a reprint of worthy John Evelyn's *Fumifugium: or the Inconvenience of the Aer and Smoake of London Dissipated*—with a short wit-edged preface by Miss Rose Macaulay. I seem to have locked in my memory the fact that the conquest of smoke by the enforcing of legislation concerning complete combustion furnaces has of late years suffered a slight set-back. The increasing use of electricity, gas and coke, and the very gradual breaking down, under the pressure of modern-minded architects, of the Englishman's passion for the live fire, and the need for placating domestics (if any) are having their beneficent effect. But I think I am not in error in stating that the vigilance of authorities has relaxed a little in respect of factory smoke.

If we had but paid attention to honest John and banished all factories six miles down the Thames! And if we had only paid attention to Wren and his plan! There is much tragedy in an if.

We might commend the vigorous idiom of Evelyn to the propagandists of our days. In his epistle dedicatory to the Merry Monarch he mitigates his zeal, pleading that as he was walking in the palace at Whitehall to refresh himself "with the Sight of Your Illustrious Presence which is the joy of Your People's hearts," he noted that "a presumptuous Smoake issuing from one or two tunnels"—chimneys, I take it—"near Northumberland House and not far from Scotland Yard did so invade the Court; that all the Rooms, Galleries and Places about it were filled and infested with it, and that to such a degree, as Men could hardly discern one another for the Clowd, and none could support it without inconveniency."

But in the preface and body of his tract the presumptuous smooke becomes a "Hellish and Dismal Clowd of SEA-COLE full of Stink and Darknesse" and "Arsenical Vapours," a threat to beauty, cleanliness, order and the very life of his adored fruits and flowers. And he had dreamed of London as a garden with palaces and houses set therein for our delight. Poor John! Poor Christopher!

A happy event of last month was the appearance of the first number of *Design for Today* from the offices of our lively contemporary, the *Week-End Review*. It is an excellent beginning. The type is clear, an 11 pt. Monotype Baskerville thin-leaded, set in double column, with margins perhaps wider than they need be; the paper is not aggressively shiny, but smooth enough to give the fine half-tones their full value. More important, the illustrations are not too much reduced—a detail which I hope will always be adhered to—fewer and larger being a better ideal than more and smaller. Camera tricks are not too much in evidence and should as far as possible be avoided, as this is a journal designed for the instruction of the plain man who doesn't want worm's or bird's-eye views of his houses and furniture.

As to the matter, I should pick out Mr. Boumphrey's article on arm-chairs full of detailed information and sound doctrine, and with its well-chosen accompanying illustrations adequately explained, as an excellent model for the approach to such subjects. News of new designs now compressed into two pages should, if intelligent manufacturers know their own best interests, swell to a good dozen, and become the most valuable and significant feature of the paper. One page of pictures is better than a dozen of talk, as we of the writing trade well know. Mr. Gordon Russell tells the heartening story of the Murphy radio set, and one notes on the news page a Bush radio case by Mr. Richter, of Bath Cabinet Makers—one good

turn creates another. Professor Aussesser has something to say of the German Art School system, which ought to be solemnly read to our educational authorities and art masters assembled together and manacled to members of the F.B.I. Mr. Gill's epigrams, aphorisms and strong uncommon sense answer the question about art, posed by an honest bourgeois hero of H. G. Wells's "What's it all bloomin' well for?" Mr. McGrath and Mr. Wells Coates show how the modern super(young) man should house himself, Mr. McGrath's design in particular demonstrating how one may occupy a "Tudor" flat and—at considerable expense, I should guess—contract out of its Tudorism.

One practical hint. The wire stitches are too thin for the paper used. They cut it, and the journal will, if it is much handled, as it deserves to be, disintegrate from the centre outwards; and the ungodly will make merry about fitness for purpose.

AND NOW MAY I INSERT HERE A DELIBERATE, IRRELEVANT AND PASSIONATE PUFF?

Get forthwith, read, re-read and make your friends read *What Would be the Character of a New War?*—a publication of the Inter-Parliamentary Union, republished at 5s. by Gollancz. There is no rhetoric in it or fanciful prophecy. It is a calm, detached exposition by solid, expert authorities of many nations of the known facts about the new apparatus of warfare that is at this moment available for that war which, as we so glibly say, is unthinkable but which is now being thought about not as a vague possibility, but as something much nearer a probability by men whose business it is to know. Naturally, it is agreed by all that no state wants war. All that is wanted is defence against other states. And that, of course, is all that is needed to make our nightmares come true.

Quotation can do no justice to these papers. It is the cumulative effect of cold reports by detached experts on the results of experiment. Yet perhaps this will serve—if well pondered—from the chapter on "Chemical and Bacteriological Warfare," by Dr. Woker, on the effects of a gas which was ready and tested in 1918 for use by the Allies against the Central Powers—no, not the other way about.

"A mixture of one part arsenic gas with 10 million parts of air puts a man out of action within a minute. In 1918 a very dilute mixture of this gas was passed over a herd of goats in an enclosure. All the animals save four were killed by the gas, and these four crushed in their skulls by butting them against the enclosure. A colleague of Major Nye entered a cloud of such low concentration that for the moment he had no suspicion of a gas mixture. A few minutes later he was overcome by violent nausea and pains. After four days a chronic arsenious inflammation of the skin appeared and his nerves suffered such a shock that the athletically built man soon became a broken wreck." Three months later he was dead.

To round this off, the report considers that two commercial aeroplanes, each carrying 600 5-lb. gas generators, could effectively gas the whole of London. And it seems to be agreed by the aviation experts that there is no possible means of keeping the two, or another two, out. The only reply is to do likewise to the enemy.

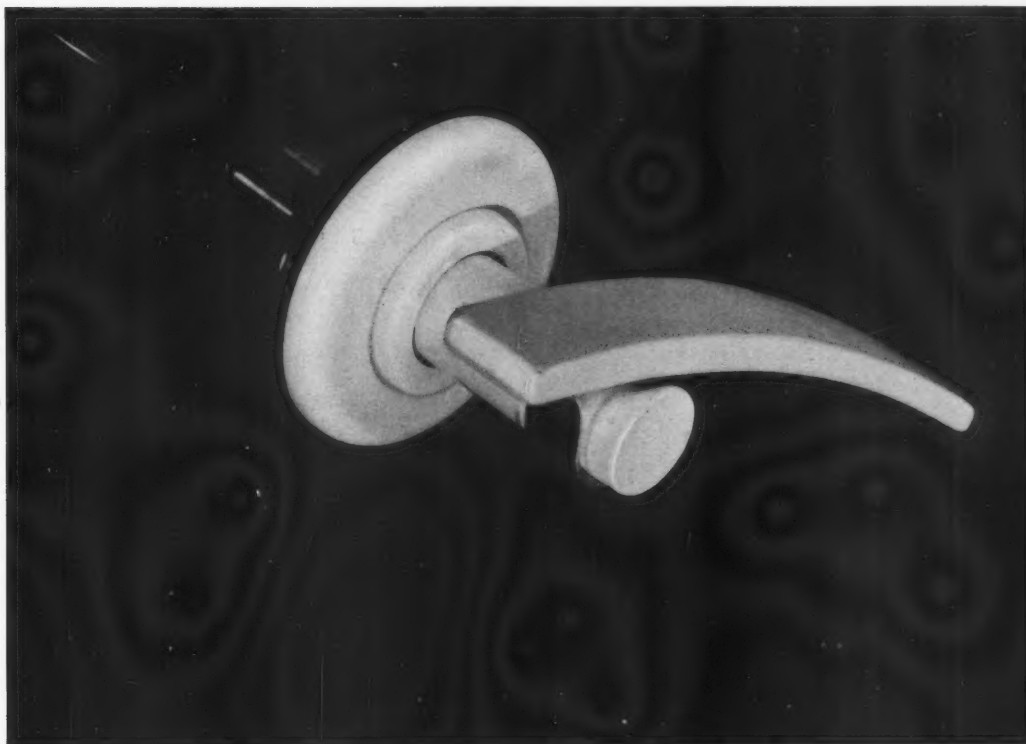
And chemical science, we are proud to recall, has made great strides since 1918.

Obviously no adequate comment can be made. READ THIS BOOK. READ THIS BOOK.

I said in my puff that it was irrelevant. But it has a deadly relevance. Why bother to build well and truly, to design fit-for-purpose, really modern chairs, if we are destined to cower in them, be choked, and after three months' reflection pass out from the scene of our well-intentioned efforts?



# THE NEW PLASTIC

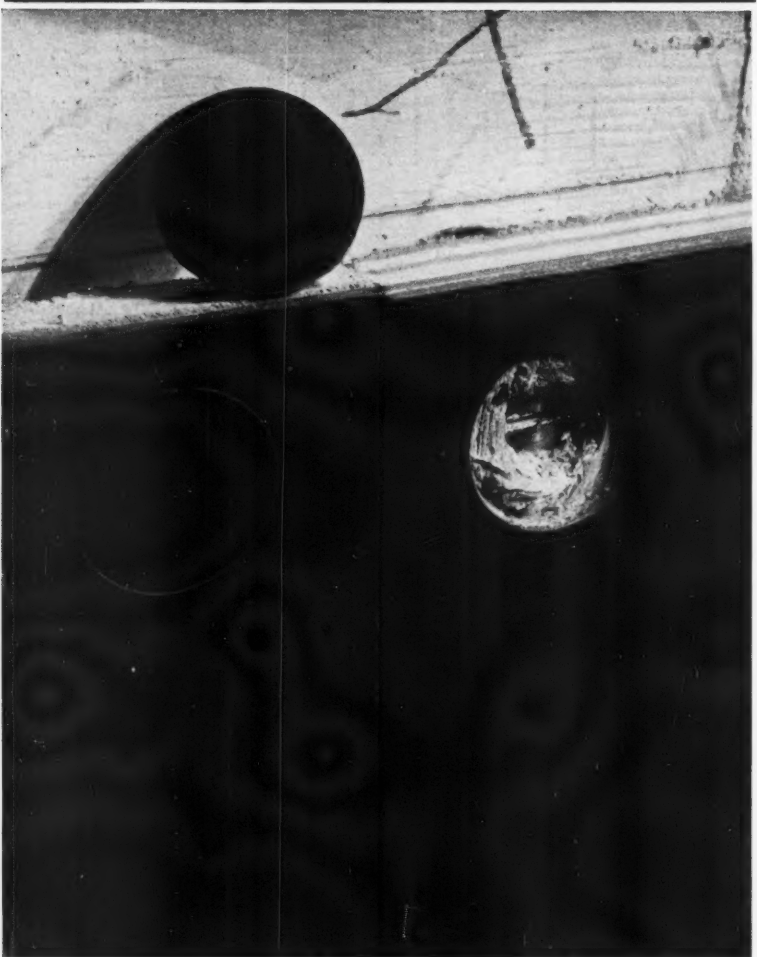


## MATERIALS

THE ARCHITECTURAL REVIEW  
DECORATION AND  
CRAFTSMANSHIP  
SUPPLEMENT

June 1933

1. The above illustration is a lever handle in blue-grey roanoid at the Midland Hotel, Morecambe. *Architect: Oliver Hill.*



The method of fixing plastic wall panelling. Laminated sheets are cemented to plywood and the panels are fixed by means of countersunk screws, covered by discs glued in afterwards.

# The New Plastic Materials

By Joseph Thorp

VISITORS to the Exhibition of Plastic Materials and Products at the Science Museum were faced with what seemed at first sight a completely bewildering and heterogeneous assortment of articles of general and special use from counters and buttons to gear wheels and mammoth castors for heavy machines, containers for soap and storage batteries, panelled walls and metal inlaid doors, artificial flowers and artificial mahogany tables, sober practical gadgets, apparatus or parts of apparatus for the engineering, the electrical and half a dozen other industries, and brilliantly (but not always discreetly) coloured ornamental articles for the toilet table, boudoir and living room. Impressive chemical genealogical tables, bowls and phials of powder and liquids, intelligently labelled, a hydraulic moulding press at work and a few genial experts to answer intelligent and less intelligent questions, gradually brought a sort of order into the chaos of the distraught layman's mind.

Here is a vigorous, actively pioneering and apparently well-organized and enlightened trade which seems almost to have grown up in a night, with an association—the British Plastic Moulding Trade Association—which possesses a monthly bulletin and a year book, conducts an information bureau and is prepared to advise as to the capabilities and limitations of the various plastic products. One received an impression, I confess, of a much greater sense of solidarity, a readiness to co-operate—to pool results of research, and work for the benefit and extension of the whole trade (rather than in entirely selfish competitive isolation) which has hitherto not been held to be a salient characteristic of British industry as contrasted with its chief competitors, Germany and America—a temper, in effect, suited to the era into which the new industry has been born.

Some more detailed quasi-technical notes on the plastics appear in another section of this issue. Here it will be sufficient to give a rapid and perfunctory survey of the main materials and processes, in order to make the general character of the proposition intelligible.

There are three basic materials, cellulose (nitro-cellulose and cellulose acetate); casein; and the synthetic resins, derivatives of coal—the phenol, urea and urea-thiourea types.

As to the first group: celluloid (cotton and paper treated with nitric acid) has been known and used since the 'seventies

of the last century. Research with a view to the elimination of the high inflammability factor resulted (about 1908) in cellulose-acetate (cotton and paper treated with acetic acid). These are both known as thermo-plastics. Both materials are worked up into sheets, rods, and tubes (the latter also into moulding powder) and can be moulded under pressure when softened by heat. They remain susceptible to softening by heat. The cellulose-acetate allowing of greater pressures and the application of greater heat than nitro-celluloid, is the more adaptable material.

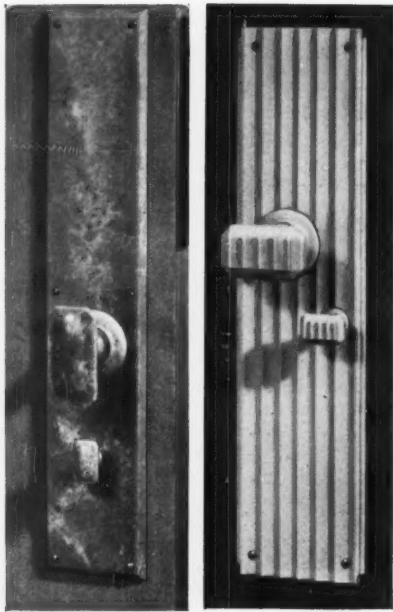
Both can, by the addition of pigments, be produced in an increasing range of colours.

As to the casein products: casein, hardened with formaldehyde—to put the matter briefly—is produced in the form of sheets, tubes, and rods which can be turned, shaped, stamped, drilled and bent. So far this material seems to have proved itself the most susceptible to beautiful and varied colouring. It is most suitable for the making of small articles, being so definitely hygroscopic to make it liable to twist if used in thin sheets of any but inconsiderable area. It is also



4. Easiwork's steel furniture exhibition stand at Olympia in 1932. The table top is veneered with black bakelite and the walls panelled with the same material.

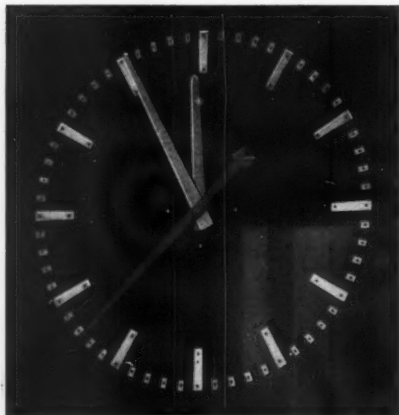




5. A cut cornered knob on a backplate with a latch knob, in roanoid at the Cumberland Hotel, London. Designers : Roanoid. 6. A fluted handle on a fluted backplate, in roanoid, at the Castle Harbour Hotel, Bermuda. Architects : Yates, Cook & Darbyshire.

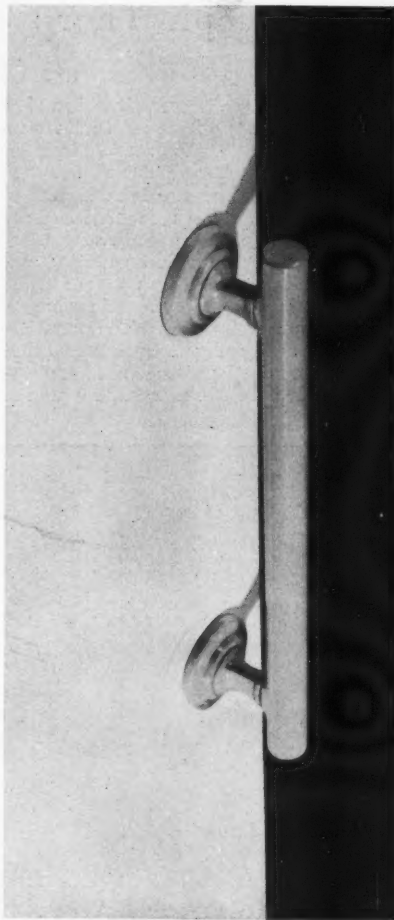
sensitive to acids. It is non-inflammable. The third or synthetic resin group is likely to be definitely of most interest to architects. This is the most lately developed group—largely a by-product of war explosives research; new discoveries and modifications are daily being made, but the practical results already achieved are startling and suggestive of remarkable possibilities. The two main members of the group are the Phenol-Formaldehyde Resins (Phenol is a Coal-Tar derivative) and the Urea-Formaldehyde Resins (Urea is a product of Carbon Dioxide and Ammonia). The Phenol is the *Bakelite*,\* the Urea the

\* Named from the American chemist, Bakeland, who, in 1910, began to work upon a hint given by Kleeberg twenty years earlier.



7. A bakelite clock face installed at the Royal Society Mond Laboratory, Cambridge. Architect : H. C. Hughes.

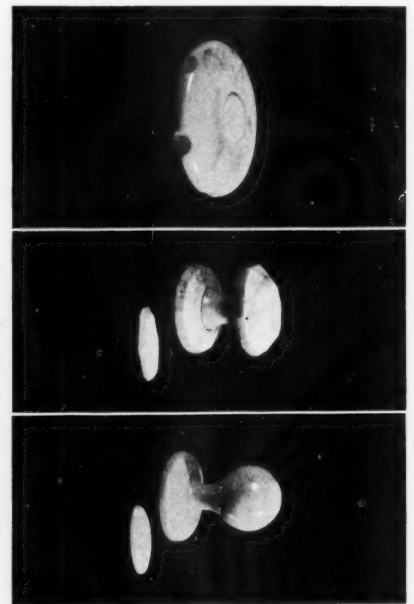
*Beall* type. There are, it is to be noted, scores upon scores of names for the products of all three (cellulose, casein and synthetic resin) groups, some faintly indicating their origin but mostly mere fancy trade names and very confusing. A few are given in the technical notes section. The Urea group has to date developed the greater variety of colouring than the Phenol, but it is quite possible that re-



8. A roanoid grip handle in marine blue at the Midland Hotel, Morecambe. Architect : Oliver Hill.

searches now going forward with the Vinyl resin of the same general family may result in catching up with the Urea products in this respect.

Both are produced in the form of moulding powders which harden permanently under heat in the hydraulic presses. To the powders are added "fillers"—wood flour or wood meal (that is triturated sawdust) which reduces brittleness and cheapens production and in the phenolic type fabric (for toughness) and asbestos (for heat resistance) may be added for special purpose manufacture. The mixture of resinous powder, filler and ground pigment is placed in the mould, kept under pressure at a high temperature for a time dependent on the size of the casting. The moulding emerges



8. A valve handle for use on ships. 9 and 10. Door handles and escutcheons which are made in roanoid in colours suited to varying schemes of decoration. Designers : Roanoid.

a hard solid with a brilliantly polished surface, non-inflammable, light, non-fragile. The new pattern table telephone, to take an instance in common experience, is built up of eight such mouldings assembled, and a study of its detail gives insight into the methods and possibilities of design for these materials.

A development which is specially interesting to the architect is the laminated form of the resinoids.

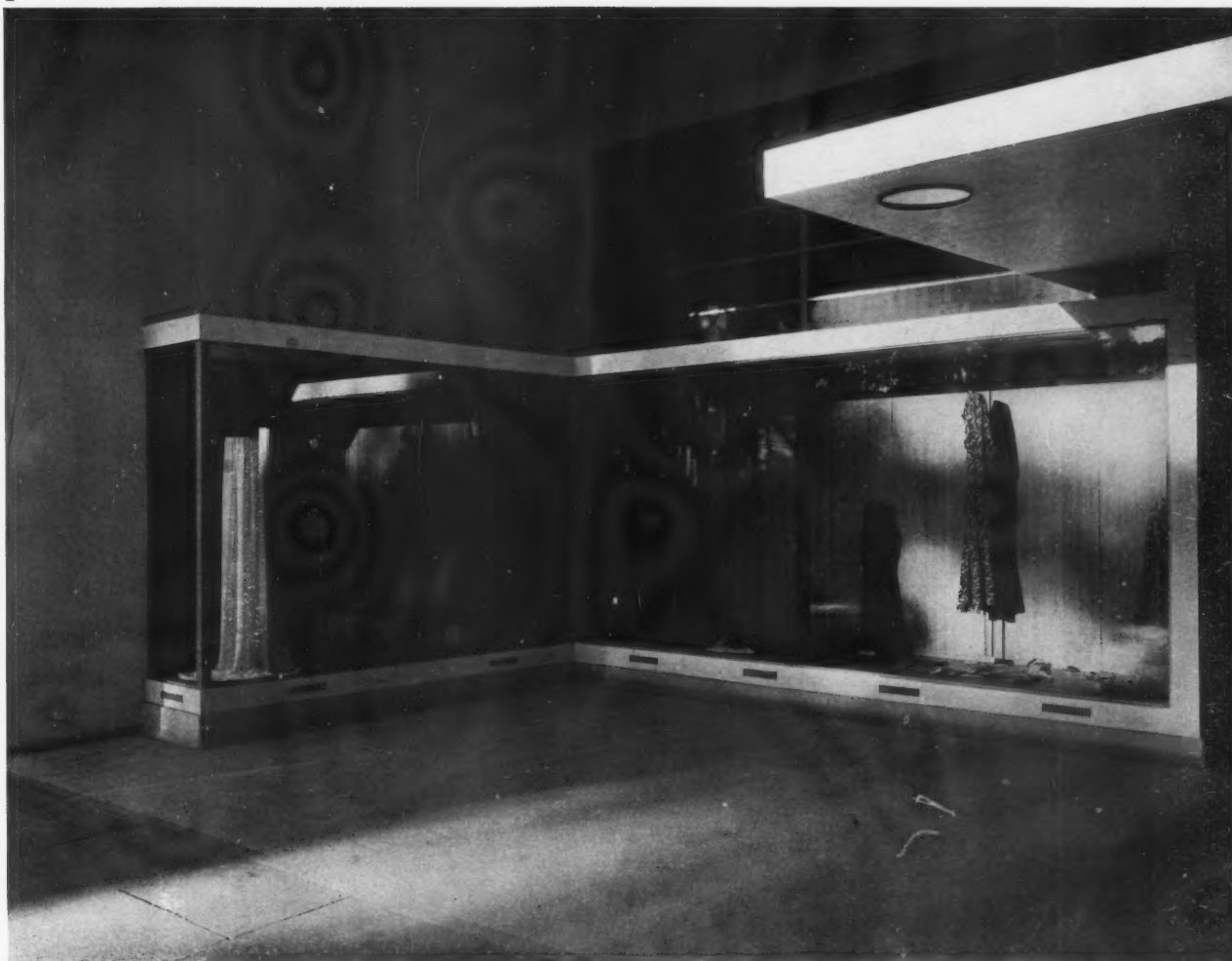
Sheets of paper, or of fabric, saturated with the resin in solution are pressed together at the appropriate temperature. They set in the form of a hard, tough, homogeneous, highly polished substance, resistant to effects of heat and moisture, of great tensile strength (paper filler 6,000 to 20,000 lb. per square inch, fabric, 8,000 to



11. One of the floor signs in Broadcasting House, London. The plastic lettering is carried out in a built-up material consisting of a thickness of ivory-coloured roanoid, cemented to the same material in black. Designer : Raymond McGrath.

[Continued on page 265]

1



2



1. A CRESTA shop at Bournemouth, Hants (1929), showing the canopy to the entrance with a circular concealed light, and the gown showcase with returned piece-goods showcase and a glazed screen over. The canopy and gown showcase are framed in steel angles, tees and channels, faced with half-inch birch plywood; the sides, soffite, window-back and window-bed are in half-inch straight-grained laminated oak veneered plywood, flush framed in solid oak with alternate opening panels at the back and concealed top lighting. The paving and stall board risers are in pink terrazzo; the glazed screen over the canopy is framed in steel, glazed with quarter-inch glaze embossed plate-glass.

*Architect* : Wells Coates. *Craftsmen* : W. Hayward and Sons. For the steelwork, The Crittall Manufacturing Company.

2. A CRESTA shop in Baker Street, London (1932), showing the decorative use of large and attractive lettering. The shop front is in oak and glass. The letters *Cresta* are designed to form the "web" of a truss which supports the transom, thus enabling a flat section to be used here in character with the other oak details.

*Architect* : Wells Coates. *Craftsmen* : D. Burkle and Sons.

## THE CRAFTSMAN'S PORTFOLIO

3



4



5



6



3. A shop front in Baker Street, London. The name of the shop is in knife-edge lettering inserted above the transom to enable the fascia proper to be left free for the projecting signs. These signs were built to the fascia with three horizontal members, thus getting away from the usual "stuck on" appearance of hanging signs. By extending the horizontal members over what is actually an office entrance on the right, the apparent size of the shop was materially increased. The colour scheme is gold cellulose relieved with turquoise.

*Designer and Craftsman : Chabot.*

4. A shop front in High Street, Kensington, London. The construction is of plain steel angle and "T" sections without additional ornament of any kind, and is glazed with glass taken from the previous arcade; the window enclosure is also of steel and is glazed with four large curved plates which formed a double bow front to the old shop. The colouring is yellow and turquoise blue, and a novel effect is obtained by curtaining in oiled silk used in three colours—amethyst, neutral, and peacock.

*Designer and Craftsman : Chabot.*

5. Showrooms in New Bond Street, London. The shop front is carried out in Australian Black Bean, with bands cellulosed in green. The window lighting is specially designed to avoid direct glare, the lamps being set in deep coffer.

*Architects : Stanley Hall and Easton and Robertson.*

*Craftsmen : George Parnall & Company.*

6. Fischer's Restaurant, New Bond Street, London. The colour scheme of the shop front is tango-red throughout, with polished metal lettering on the fascia. The front is glazed with  $\frac{3}{8}$  in. pale green glass except the long show window which is glazed with clear plate and divided into display compartments by double-sided mirrors.

*Architect : Raymond McGrath.*

*Craftsmen : Higgs and Hill.*

7. A shop front in Berkeley Street, London. The materials used are plymax, galvanized finished and cellulosed sprayed. Chromium plated metal is used for frames, glass door bar holders, trade mark and small letters; the large letters are in painted metal with Neon lighting.

*Designers and Craftsmen : Marc-Henri and Laverdet.*

8. A shop front in Sloane Street, London. The front was originally a section of a large shop built underneath a block of flats. It was divided up so as to make it suitable for occupants needing less accommodation than it was originally designed for. In the old front there were two small pillars holding panes of glass together, which were of late Victorian design. They were merely there for the purposes of decoration, and had nothing to do with the main building; the pillars were removed, and the same panes of glass were used in the new front by fixing them together with small clips. A large and almost tassel-shaped pillar formed one of the supports of the whole building. By judicious hammering the largest part of the projections was removed, and what remained of the pillar was surrounded with stainless steel in an hexagonal form. Below the window a wide band of stainless steel was applied, and below that, as a step, a band of imitation marble. The rest of the front was then painted in two shades of grey, and the name of the firm affixed in letters cut out of stainless steel. A platform was inserted and covered with squares of silver birch placed so that the grain ran in alternate directions. That was stained a pale shade of grey.

*Designer : Mrs. D. Brinley Richards, in association with C. E. Brooks.*

*Craftsmen : Holtum and Green.*

9. A scent shop in beige marble in Old Bond Street, London. The designer of the gilt bronze entrance door was Reco Capey.

*Architect : Ruhlmann, of Paris. Craftsmen : Sage & Company. For the entrance door, The Birmingham Guild.*





8



9

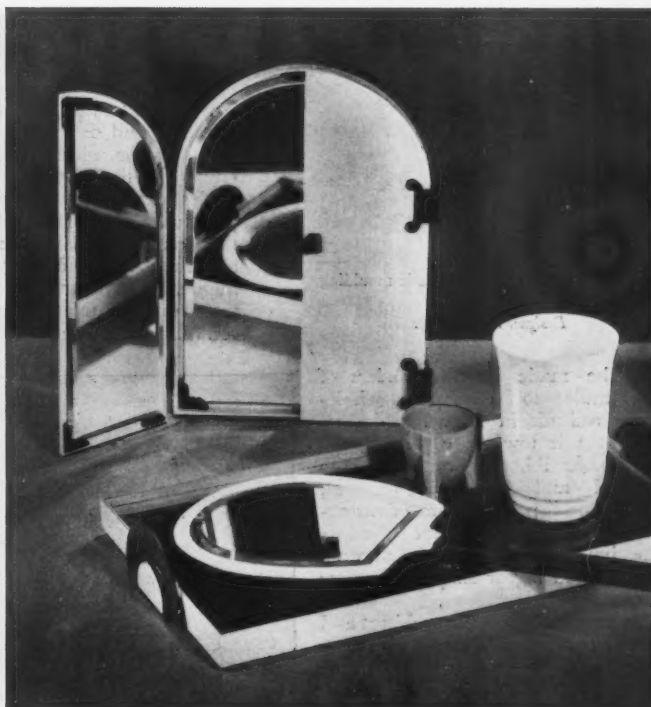
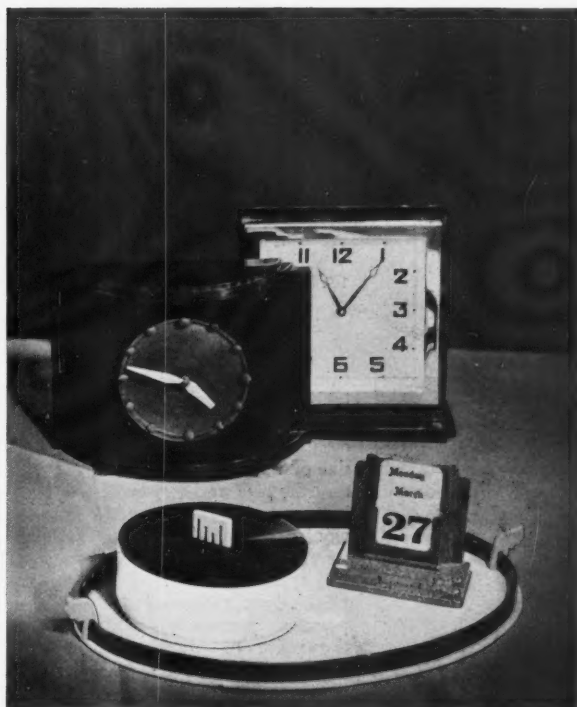
10



11



10. An existing shop front in the Kensington and Knightsbridge Electric Lighting Company's showrooms, modified in connection with the remodelling of the interior. The neon sign in blue and gold was made by Claude-General Neon Lights. The entrance door is glazed with wired glass manufactured with horizontal wires only. *Architect*: Raymond McGrath. *Craftsmen*: Trollope & Sons. 11. The doors and fascia of this *Easivork* shop are carried out in grey and blue ceramic mosaic with vitreous gold insets. The lettering and metalwork are in stainless steel. The riser is of black glass. The paving is in ceramic mosaic. The ceiling of the lobby and cove above the show-windows are covered with 1/16 in. yellow and blue rubber. *Architect*: Raymond McGrath. *Craftsmen*: Hickman and Carter & Company. Ceramic mosaic by Carter's. Rubber by the North British Rubber Company.



12 and 13. Experiments by a young sculptor, Harold Dow, for the British Xylonite Company by way of demonstrating the proposition that to treat plastic materials without humbug so as to bring out their own qualities of varied and brilliant colour (which monochrome reproduction unfortunately fails to show) and pleasant matt texture or high polish giving interesting

reflections, is more satisfactory than to follow the traditional path of natural substances such as tortoise shell and ivory. A greater adventurousness in the shapes than has been customary in a trade much fettered by rather drab conventions has been attempted, with at the same time a careful attention to the important practical point of making the moulds as simple as possible.

12,000 lb.). As a proof of the toughness of the laminated fabric substance one notes that the silent gear wheels made of it (as in Sir Malcolm Campbell's "Bluebird") outlast the metal wheels with which they engage.

The laminated paper product has a glass-like hardness and brilliance, and suggests interesting possibilities for the covering of wall surfaces, particularly perhaps in those *jeux d'esprit* of the modern architect, the restaurant, the bar, milady's bathroom, the liner, the shop window.

Some further possibilities in this lamination business may be noted—not without dismay at the indiscretions to which, in uninstructed hands, they may lead.

Any design may be photographically impressed on the top layer of the lamination; or a cartoon drawn upon it before impregnation, compression and homogenation (to coin a barbarous word).

It will be no surprise to the architect to hear that the plastic pioneers are particularly proud of the feats of imitation of the texture and colour of various woods—and down this turning the industry shows signs of plunging with zeal, following in the track of the celluloid and casein products with their imitations of tortoiseshell, ivory, and refusal to treat their material on its own merits.

One interesting decorative development will suggest itself to the artist. If the second lamina (or layer of laminae) be of a different colour from the first a *sgraffito* treatment would be possible—the material cuts cleanly and offers no cross-grain troubles.

To return to the moulded as distinguished from the laminated forms of the Phenol and Urea products. A survey of the exhibits at South Kensington tends to indicate that the cutting of the steel moulds, being a difficult and expensive business, has tended to simplify design. Perhaps also there is here some fruit of the recent careful sowing of the idea that there is æsthetic value as well as economy in simplicity. By way of proving what the mould can do in the hands of a really skilful and misdirected craftsman, there is indeed a radio-set case whose fantastically florid and depressing elaboration must positively be seen to be believed. As is natural the purely technical objects where there has been no attempt at decoration are uniformly excellent.

Just as there are great possibilities there are great dangers in the development of these new products. Quite clearly the trade runs, as I have said, to "imitations." "Its possibilities," says the Association's Bulletin of the Urea-resin material, "for imitating wood, marble, porcelain, etc., are daily bringing it into greater prominence." It is to be hoped that a conscious effort



14. Table ware made from Beetle moulding powder. Designers: M-L. Magneto Syndicate.





15. Table ware made from Beetle moulding powder.  
Designer : E. Elliott.

will be made by the leaders of the trade to develop a wholesome attitude in regard to design, to direct it towards exploiting the admirable inherent qualities, the natural and contrived textures, the endless potentialities of attractive colouring, and not towards the imitation either in appearance, colouring or shaping of other materials.

Here it is obvious the architect and the trade can be of use to each other. The architect needs the materials, the trade needs some help in the creation or direction of design. I say the architect—I ought perhaps to explain that I am not an architect—because he is a designer who is accustomed to handle and assess materials, to study process and to think in three dimensions about the decorous shaping of materials for a practical purpose, therein differing from the designer who too often thinks in the flat. The sculptor who also thinks and works in the round might have his contribution to make, but in so far as he was artist as distinguished from practical craftsman—I make the distinction *pace* Mr. Eric Gill—he might be less useful.

As a complement to the elaborate laboratory researches into the nature of thermo-plastic and thermo-hardening materials, there is need of research and experiment directed to the proper development of design, in the spirit of Lethaby's ever-fresh *Art and Workmanship*, one of the early manifestoes of the Design and Industries Association. It should be in

the hands of every "plastician" and, incidentally, indicate with what sanity the true designer approaches his work.

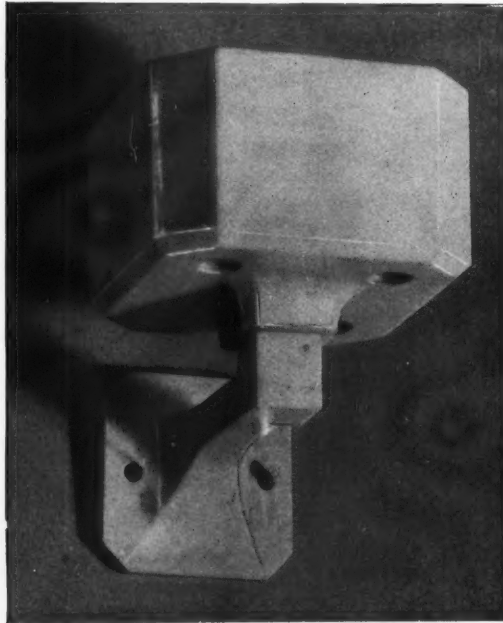
As to the present use of these materials it would seem that, apart from the purely practical and directly functional applications by the mechanical and electrical engineers, the Toy, Gadget and Vanity trades are absorbing the bulk of the product. There is an obvious future on the evidence already submitted as a substitute for ceramic ware, light, less fragile. Manufacturers of luxury commodities draw upon it largely for elegant containers. There would seem to be



17. Table ware made from Beetle moulding powder.  
Designers : M-L. Magneto Syndicate.

think in terms of standard parts joined together, as the moulds are the expensive factor—expense increasing out of all proportion as the size of the moulded unit and therefore the size and power of the press increase. And, of course, the expense would be prohibitive (and senseless) for the production of an individual fitting or of a few. But here, certainly, is a range of materials with peculiar properties—of hardness to the point of practical unscratchability, lightness, insensitiveness to moisture and acid, great tensile strength relative to weight, susceptible of the most elaborate and permanent decorative treatment, fire-resisting—which is worth the study of the architect as practical house-maker, and of the architect as likely Master-Designer, if I may take leave to flatter him with that designation.

There is a method of using these plastic materials by moulding them round a metal core as seen in the everyday steering wheel which might have possibilities in the direction of labour-saving handles, casement stays and the like, for the weathering properties of the resin plastics are remarkable, and I have the impression further, that if any architect liking the look and feeling of these materials, but demanding some special purpose quality which they do not at present possess, were to march boldly up to the chemists of the industry and demand that specific quality, it could forthwith be incorporated. For these gentlemen seem to be nothing short of wizards.



16. A tumbler holder made in a synthetic moulding material which is non-inflammable and practically unbreakable. The cost of this material compares very favourably with metal, porcelain, etc.  
Designers : N. B. Mouldings.

many uses the architect could find for the thermo-hardening plastics in his own work, quite apart from the contribution he might make as a director of design. Switch plates, door furniture, lamp standards—these are common applications today. But there seem to be limitless possibilities. Mr. Raymond McGrath is actively experimenting with the material for wall and door coverings and for the making of furniture. The approach for the designing of fittings must be to



18. A hors d'œuvre dish made from Beetle moulding powder.  
Designers : M-L. Magneto Syndicate.

# ANTHOLOGY

## VERSES

on

### SIR JOSHUA REYNOLDS' Painted Window

At New College, Oxford

Ah, stay thy treacherous hand, forbear to trace  
Those faultless forms of elegance and grace !  
Ah, cease to spread the bright transparent mass,  
With Titian's pencil, o'er the speaking glass !  
Nor steal, by strokes of art with truth combined,  
The fond illusions of my wayward mind !  
For long, enamour'd of a barbaric age,  
A faithless truant to the classic page ;  
Long have I loved to catch the simple chime  
Of minstrel-harps, and spell the fabling rhyme ;  
To view the festive rites, the knightly play,  
That deck'd heroic Albion's elder day ;  
To mark the mouldering halls of barons bold,  
And the rough castle, cast in giant mould ;  
With Gothic manners Gothic arts explore,  
And muse on the magnificence of yore.

But chief, enraptured have I loved to roam,  
A lingering votary, the vaulted dome,  
Where the tall shafts, that mount in massy pride,  
Their mingling branches shoot from side to side ;  
Where elfin sculptors, with fantastic clew,  
O'er the long roof their wild embroidery drew ;  
Where Superstition with capricious hand  
In many a maze the wreathed window plann'd,  
With hues romantic tinged the gorgeous pane,  
To fill with holy light the wondrous fane ;  
To aid the builder's model, richly rude,  
By no Vitruvian symmetry subdued ;  
To suit the genius of the mystic pile :  
Whilst as around the far-retiring aisle,  
And fretted shrines, with hoary trophies hung,  
Her dark illumination wide she flung,  
With new solemnity, the nooks profound,  
The caves of death, and the dim arches frown'd.  
From bliss long felt unwillingly we part :  
Ah, spare the weakness of a lover's heart !  
Chase not the phantoms of my fairy dream,  
Phantoms that shrink at Reason's painful gleam !  
That softer touch, insidious artist, stay,  
Nor to new joys my struggling breast betray !

Such was a pensive bard's mistaken strain.—  
But, oh, of ravish'd pleasures why complain ?  
No more the matchless skill I call unkind,  
That strives to disenchant my cheated mind.  
For when again I view thy chaste design,  
The just proportion, and the genuine line ;  
Those native portraiture of Attic art,  
That from the lucid surface seem to start ;  
Those tints, that steal no glories from the day,  
Nor ask the sun to lend his streaming ray :  
The doubtful radiance of contending dyes,  
That faintly mingle, yet distinctly rise ;  
Twixt light and shade the transitory strife ;

The feature blooming with immortal life :  
The stole in casual foldings taught to flow,  
Not with ambitious ornaments to glow ;  
The tread majestic, and the beaming eye,  
That lifted speaks its commerce with the sky ;  
Heaven's golden emanation, gleaming mild  
O'er the mean cradle of the Virgin's child :  
Sudden, the sombrous imagery is fled,  
Which late my visionary rapture fed :  
Thy powerful hand has broke the Gothic chain,  
And brought my bosom back to truth again ;  
To truth, by no peculiar taste confined,  
Whose universal pattern strikes mankind ;  
To truth, whose bold and unrestricted aim  
Checks frail caprice, and fashion's fickle claim ;  
To truth, whose charms deception's magic quell,  
And bind coy Fancy in a stronger spell.

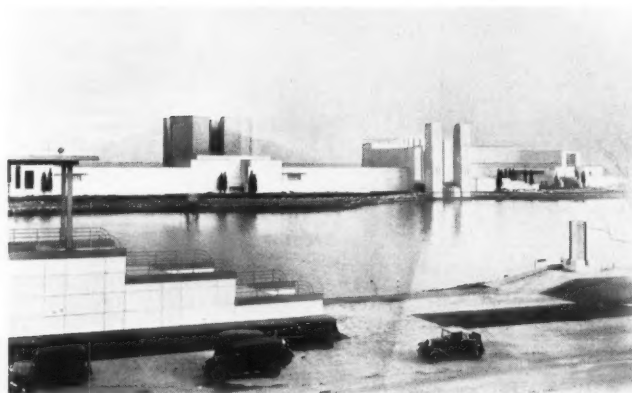
Ye brawny prophets, that in robes so rich,  
At distance due, possess the crisp'd niche ;  
Ye rows of patriarchs, that sublimely rear'd  
Diffuse a proud primeval length of beard :  
Ye saints, who, clad in crimson's bright array,  
More pride than humble poverty display :  
Ye virgins meek, that wear the palmy crown  
Of patient faith, and yet so fiercely frown :  
Ye angels, that from clouds of gold recline,  
But boast no semblance to a race divine :  
Ye tragic tales of legendary lore,  
That draw devotion's ready tear no more ;  
Ye martyrdoms of unenlighten'd days,  
Ye miracles, that now no wonder raise :  
Shapes, that with one broad glare the gazer strike,  
Kings, bishops, nuns, apostles, all alike !  
Ye colours that th' unwary sight amaze,  
And only dazzle in the noontide blaze !  
No more the sacred window's round disgrace,  
But yield to Grecian groups the shining space.  
Lo, from the canvas Beauty shifts her throne,  
Lo, Picture's powers a new formation own !  
Behold, she prints upon the crystal plain,  
With her own energy, th' expressive stain !  
The mighty Master spreads his mimic toil  
More wide, nor only blends the breathing oil ;  
But calls the lineaments of life complete  
From genial alchymy's creative heat ;  
Obedient forms to the bright fusion gives,  
While in the warm enamel Nature lives.

Reynolds, 'tis thine, from the broad window's height,  
To add new lustre to religious light :  
Not of its pomp to strip this ancient shrine,  
But bid that pomp with purer radiance shine :  
With arts unknown before, to reconcile  
The willing Graces to the Gothic pile.

By THOMAS WARTON THE YOUNGER

Published 1782

# MARGINALIA



The Electricity Group at the World's Fair, Chicago.

## WONDERS OF THE WORLD UNITE

On June 1, a ray of light which left Arcturus during the Chicago World's Fair of 1893, acted on a selenium cell and set the wheels of the New Chicago World's Fair turning. At the new Fair there is a tree that grows as you watch it, and in 75 seconds passes through the phases an ordinary tree goes through in a year. In the Electricity Group there are, on the other hand, cypress trees of steel, and gilded pylons tower above the exhibits. Elsewhere there is a transparent man who looks like a living X-ray photograph. All the buildings, which are in the modern style, are flood-lighted—cascades and pillars of fire shimmering with colour everywhere complete the scene. We hope to give further information about this remarkable exhibition in a forthcoming issue.

## MODERN ARCHITECTURAL RESEARCH

Some years ago a number of well-known Continental architects formed what is known as "The International Congresses for Modern Architecture"—an association of various national groups of architects united by a common realization of the necessity for a new conception of architecture and its relation to the structure of society today.

Many solutions of contemporary architectural problems—such as, for instance, the problem of the "Minimum Dwelling"—have been discussed and formulated at the Congresses, which have been held at La Sarraz, Switzerland (1928), Frankfurt (1929), and at Brussels (1930), when official delegations from 19 national groups—not, however, including Great Britain—attended.

At the invitation of the President and Secretariat of the international association, Mr. Wells Coates has now formed the nucleus of a British group of architects, engineers and town planners, whose work will be officially associated with the research programme of the International Congresses.

The new group will be known as the "Modern Architectural Research Group." Programmes and procedure for immediate research are now being prepared, and further details will shortly be published in the leading architectural journals.

The hon. secretary is Mr. F. R. S. Yorke, A.R.I.B.A., 3 Wine Office Court, London, E.C.4.

## AN AUSTRIAN ARCHITECT LOOKS AT ENGLAND

Professor Josef Frank, the distinguished Viennese architect, who, as President of the Austrian "*Werkbund*," organized the internationally-designed exhibition of small dwellings held in Vienna last summer, recently paid his first visit to England. As Professor Frank is a great admirer of the English tradition, and has had wide experience in the design both of middle-class houses and large municipal tenement-blocks, some excerpts from a letter he wrote on his return home from London may be of interest.

### BECONTREE

"Looking back on all I have learnt, I am aware that, with the exception of the architecture of the ancient world, English buildings have always had a stronger appeal for me than those of any other country. I consider that even today the much freer and lighter furnishing of the English home

still presents the best solution of the interior problem. The types of small municipal houses I saw at Becontree had not merged their domestic identity in rigid theories. They seemed to have the advantage of retaining something 'human' in their appearance, and looked quite appropriate for the average unassuming man who does not ask too much. In Austria and Germany, on the other hand, there is so often a basic contradiction between what the architect expects from the tenant and what the tenant is able to do in the way of fulfilling his demands. I found the lay-out of Becontree very interesting from our point of view in a general sense, though in detail it has nothing particular to offer.

### JAZZ-MODERN

"What caused me real pain was that I gained the impression (perhaps as a result of having seen too little) that your furniture was no longer of the same beauty of design that it used to be. It would appear that the old traditional shapes are now considered too tiresome, and that an imitation of bad modern French and German models prevails because your designers are hopelessly undecided what to adopt instead. But this is probably only a transitional phase which will disappear when, if ever, calmer times return. Should the almost total cessation of building, which is now general throughout Europe, continue much longer, we must anticipate one of those lacunæ in the evolution of architecture that have always coincided with similar economic crises in the past. One cannot help being curious as to the direction in which architectural development will ultimately be resumed. In view of the world's impoverishment, we may, perhaps, expect to see utilitarian forms emerge which, like those of the early nineteenth century, are truly realistic—by which I mean forms that have shed a false emphasis of their utilitarian nature which is now so often employed as a kind of decoration. Let us hope that new impulses along these lines will soon begin to reach us from England, where the simple, straightforward sense of reality always used to be so strong."

### ANOTHER MASEFIELD?

Cosy little houseboat, anchor'd up at  
Henley,  
Jolly crowd of people full of jazz and  
fun,  
With a cargo of fretwork and home-  
made pottery,  
Leatherwork and stencilling and *all*  
*hand done.*



### THE WRONG ATMOSPHERE

"Catholics suffer from non-Catholic surroundings in a country which is cut off from Europe."

ARCHBISHOP WILLIAMS in *The Universe*.

### RIGHTED

"The new building will be in fifteenth-century Venetian Gothic style."

—*Catholic Herald*.

### THOROUGHLY

While, beside a picture of a simple early nineteenth-century Catholic Chapel in Liverpool, are printed the following lines: "The modest external appearance gives no hint of the wealth of marble, glass and gold adornment that embellishes its interior."

The quotation is from the *Catholic Times*.

### ARTY-CRAFTY INFORMATION FROM WATFORD

"The eighteenth and nineteenth centuries were periods when horrible things were made in the name of beauty. Now is our opportunity to be rid of them. Those who are unemployed should be given every possible opportunity of showing what they can do; and from the best hands should come rich work, and to them should be given the creation or restoration of beauty up and down our land."

—*Watford and West Herts Observer*.

### LESS ARTY-CRAFTY NEWS

"The Official Referee, giving judgment for Mr. Griffiths (occupant of the house in question) remarked that plaintiffs were builders on a large scale who developed sites and advertised houses for sale. On the High View

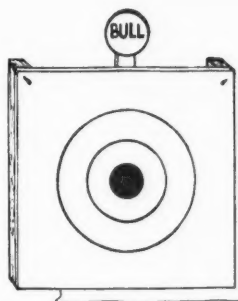
variety of Portland stone and interesting technicalities of quarrying it may occur. The South Western Stone Company have produced a book on Portland stone which helps to explain these mysteries. Those who have met the long-shanked, yellow-haired Portlanders, who rarely marry a "foreigner" from the mainland and who have worked in the quarries for centuries, will probably not have gleaned much information from such men. Architects will realize the infinite possibilities of Portland stone, its many different qualities, from this short illustrated book, and it should be possessed by all people interested in masonry.

### THE ARCHITECTURAL REVIEW SERIAL

WHAT A LIFE! *An Autobiography*. Taken from Whiteley's General Catalogue for 1910 by E. V. Lucas and George Morrow and published by Methuen & Co. in 1911. Thanks are due to all these people for permission to reprint this thrilling yarn.

### FOR NEW READERS

Born amid scenes of savage grandeur in Metroland, son of a hospitable but delicate father, fond of travel and a great cigar smoker, whose wife adored him and followed his wanderings on the globe, I was. Now read on.



Our head keeper—good fellow!—saw to it that the birds were plentiful.

My father was not only a dead shot—

but, as a huntsman, frequently returned home after a long day with the harriers

tired but triumphant, with the brush.



My earliest recollection is of lying in the cradle and wondering if lying was my destiny.



### ARCHITECTS AS ARTISTS

### A NOVEL EXHIBITION

—Headlines in *The Observer*.

### MR. FISHBURN

"Mr. Fishburn has a natural aptitude for building... he is a bespoke tailor by trade, and a bachelor... He saved his money, however, and bought two allotments in Stirling Road and Mansfield Road, Brierley. On the latter he commenced building his first house. He drew his own plans. After practically three years' work from dawn until after dusk, and without any aid except for the plumbing, he built a house known as 'The Laurels.'"

—*Wharfedale and Airedale Observer*.

Estate they built 320 houses without an architect. The elder plaintiff was a partner of Geo. Reeves and Co., estate agents, and one of his sons was a member of the firm of Lloyd and Davey, solicitors, who acted for plaintiffs...

Huge patches of damp came on the walls, on which fungus grew, bedclothes had to be dried every day, furniture was seriously damaged, and the health of the family suffered considerably.

... and Mr. G. J. Davey, one of the plaintiffs, contended that he had acted most generously with defendant, and would never again sell a house with so small a deposit.

—*News of the World*.

### PORTLAND STONE

To those who contemplate the white cliffs of Regent Street or the classical fronts of our great banks, little of the

### DESIGN FOR TODAY

When a paper appears, you may take it that three or four thousand people at least have felt the need for it, otherwise no one would have been foolish enough to publish it—certainly not in England, where intelligent publications are reduced to the minimum.

It is therefore most encouraging to realize that public interest is at last awakening to the necessity for having things sensibly designed in houses and offices, in substituting the serviceable for the fake antique. *Design For Today*, whose first number appeared last month at the price of a shilling, is an excellent monthly periodical on this subject.

The first number, edited by Mr. Noel Carrington, whose book *Design In The Home* is reviewed on pages 252-3 of this issue of THE ARCHITECTURAL REVIEW, contains an article on Art and Industrialism by Eric Gill, numerous illustrations of tweeds, motor cars, wireless cabinets and easy chairs. It is well worth buying.

Y.H.A.

England is being appreciated, and it is interesting to find the Carnegie United Kingdom Trust (nineteenth Annual Report) on the side of the hikers. The Youths' Hostel Move-

country from the monotony of their home surroundings. The architectural example alone of these hostels should do much to increase public detestation of jerrybuilding and bungalowoid growth.

A COTSWOLD PAMPHLET

The Lygon Arms, Broadway, has published a pamphlet on *Broadway and the Cotswolds* at the price of one shilling. It is a change from the average guide. The cover is attractive, an essay in the Regency manner with Bodoni type neatly encased in a border; the

CORRESPONDENCE

ERRATUM

The Editor,

THE ARCHITECTURAL REVIEW.

SIR,—May we be allowed to correct in your pages two inaccuracies in the review in your May issue of our book, *Houses and Gardens*.

In our description of the Cottage in Pembroke we wrote: "Here in a somewhat exposed position, our intention was to follow the old tradition of the locality and to give the whole building, roof and all, a waterproof coat of colour-wash mixed with tallow. The owner,

Of all my nurses,  
Gregson was my  
favourite.



She was the daughter of a poor  
broken-down clarionet player,  
but was really a lady in spite  
of her garb  
of servitude.



(To be continued)

ment, according to the report, has been aided by the Trust, and upwards of 160 hostels already exist in England. These are modest and not unpleasant buildings, sometimes cottages, and farmhouses converted. The Trust is especially interested in the provision of four or five pivotal demonstration hostels of a larger and more substantial kind than the normal one-night hostel for twenty to thirty persons. The dormitories are simply furnished with beds, mattresses and rugs, and wooden arm-chairs. There are also rooms for meals. It has been found possible to admit unemployed persons to some of these, who would otherwise have no opportunity of getting away to the

information is accurate and the photographs beautiful. Of Snowhill this guide says: "The manor house is of great interest architecturally and otherwise." It is; for there lives Mr. Charles Wade whose wonderful model village was illustrated in THE ARCHITECTURAL REVIEW for January, 1932. There is but one defect to this adequate and well produced pamphlet—much Georgian architecture, with which the Cotswolds are as richly endowed as any other part of England, gets hardly any mention. Nevertheless, the pamphlet is invaluable to anyone who wishes to visit the Broadway district. Would that other local guides were half so good as this one.

however, who evidently considered an umbrella better than a mackintosh as a protection from weather, insisted on overhanging the roof at the gables, thereby attaining the kind of flimsy picturesqueness associated with the cuckoo clock." We never proposed to omit the gables shown in the sketch, but only objected to the wide projection of the roof verges over them, on which the owner insisted.

Again, in the description of Waterlow Court, we wrote: "Its occupants are definitely restricted to what W. S. Gilbert would probably have called that singular anomaly, the working lady." We did not, ourselves, as the review suggests, endorse this Victorian idea.—Your obedient servants,

BAILLIE SCOTT AND BERESFORD.  
29 John Street, Bedford Row, W.C.1.

# MARBLE DECORATION



*Martin's Bank New Headquarters*

*Architect : Herbert J. Rowse, F.R.I.B.A.*

*a British production  
by  
L. John & Co. Ltd.*



# Notes on New Plastic Materials

THE impetus towards the discovery of the already complex and rapidly developing series of artificial plastic materials has been given by the desire to find inexpensive substitutes for such materials as horn, tortoiseshell and ivory, or substitutes for rare woods such as ebony, rosewood and lignum vitæ; as also to contrive special purpose materials (with properties of durability, elasticity, effective insulation, etc.) for the mechanical and electrical engineers, and the gramophone and wireless industries—among many others.

## NATURAL PLASTICS

Of the natural plastics we may note the mineral bitumen used 5,000 years ago by the Egyptians for the casing of mummies; the natural animal plastics such as horn, tortoiseshell, ivory and bone; and the natural vegetable plastics—cellulose and the vegetable proteins; and the natural resins (lac, rosin, copal, amber).

Derived from the natural animal pro-

ducts are casein (from milk) and from vegetable products nitro-cellulose (celluloid) and cellulose acetate (commonly known as "non-flam" celluloid).

## SYNTHETIC PLASTICS

The most modern and significant group consists of the synthetic plastics of which the two best known and most fully developed are the Phenol-formaldehyde and the Urea-formaldehyde types. The former is here conveniently referred to as the *Bakelite*, the second as the *Beatl* type. These are both trade-mark names. They stand in the same relation to the products of the new trade as gramophone and pianola to the talking machine and piano-playing trades—specific pioneer names with a popular general application.

## CELLULOIDS

Of the two celluloids little need here be said except to note that both are thermoplastic materials, softened by heat for moulding, and hardening when cool, but not permanently altered in chemical

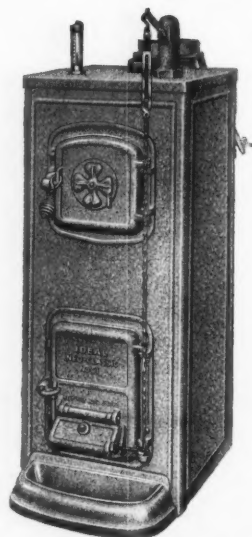
structure or physical by the heating process; and that the inflammable properties of the nitro-cellulose product have been eliminated in the cellulose-acetate. Great strides have been made in the matter of effective coloration. The products of this group are marketed under a variety of names such as Rhodoid, Xylonite, Bexoid, Cellon, Celastoid, Sicoid, etc., etc., and they might find a use with architects in their translucent forms as masks for electric lighting.

One process, however, in connection with the use of cellulose acetate moulding powder is worth remembering by architects who may require hard-surfaced moist-resisting fittings, e.g., in a decorated bathroom (taps, towel rods, etc.). It is the moulding of the plastic material over a metal core—such as is seen in the handles clutched by the unhappy strap-hanger and the steering wheels of motor-cars—a process also applicable to weather-proof steel signs, inscriptions or permanent notices.

## CASEIN PRODUCTS

Nor are the casein products (such as Galalith, Erinoid, Sicalite, Lactoid), though they are now capable of production in an unlimited range of very beautiful colours, of any significant interest to the architect. It is of interest to the amateur chemist to note that the constituent formaldehyde is common to this group and the synthetic resin groups alike; and the curious may appreciate the

## IDEAL NEO-CLASSIC



The new Sectional Boiler for residential heating and hot water supply. Combines highest efficiency with neat appearance and simplicity. As shown at the Ideal Home Exhibition.

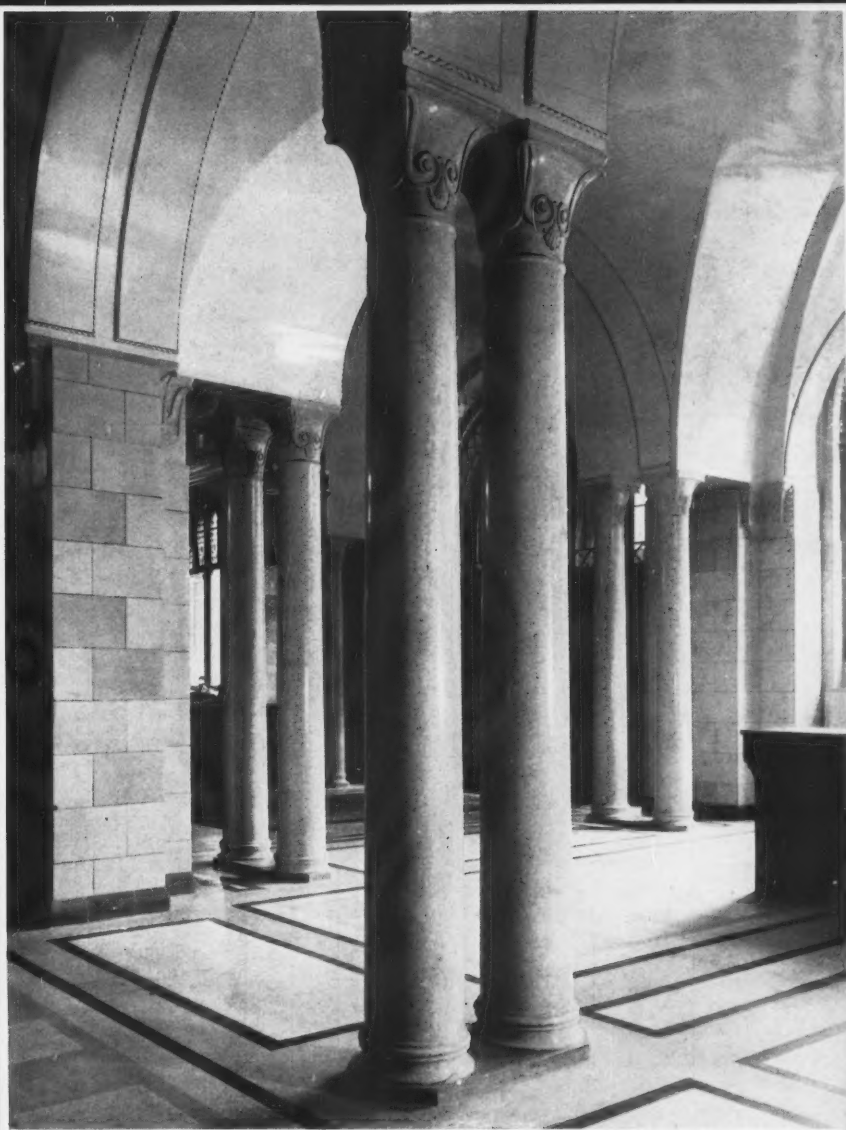
A small compact Sectional Boiler which can be enlarged for subsequent extensions to installation. Fitted with loose grate bars—the most efficient for this type of boiler. Waterway extends under ashpit—no fire risk. Interchangeable smokehood. Insulating jacket finished in durable and attractive Ideal Vitreous Enamel. No. 1 Series—five sizes for 165 to 425 sq. ft. of direct radiation. No. 2 Series—with greater capacities, ready shortly.

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## POLISHED PORTLAND STONE

Column Shafts and Caps in the new extension  
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# FENNING

RAINVILLE RD., LONDON, W.6 · FULHAM 6142-3

quite probably apocryphal story that casein was accidentally discovered by a German professor finding his cat's saucer of milk set into a stone-hard solid, owing to the upsetting into it of a bottle of formaldehyde. The casein plastic is best suited for small articles of a decorative nature—beads, buckles, umbrella and other handles, fountain pens; it has insulating properties that make it suitable for many purposes in the electrical industry such as switch handles, bell pushes, small switch plates, etc., etc. It is not suitable for use in sheets of any large area, its sensitiveness to damp being sufficient to make it liable to distortion. It is non-inflammable. It is hard and takes a brilliant polish. Can be sawn, turned, drilled, stamped, pressed, embossed, and, with limitations, moulded.

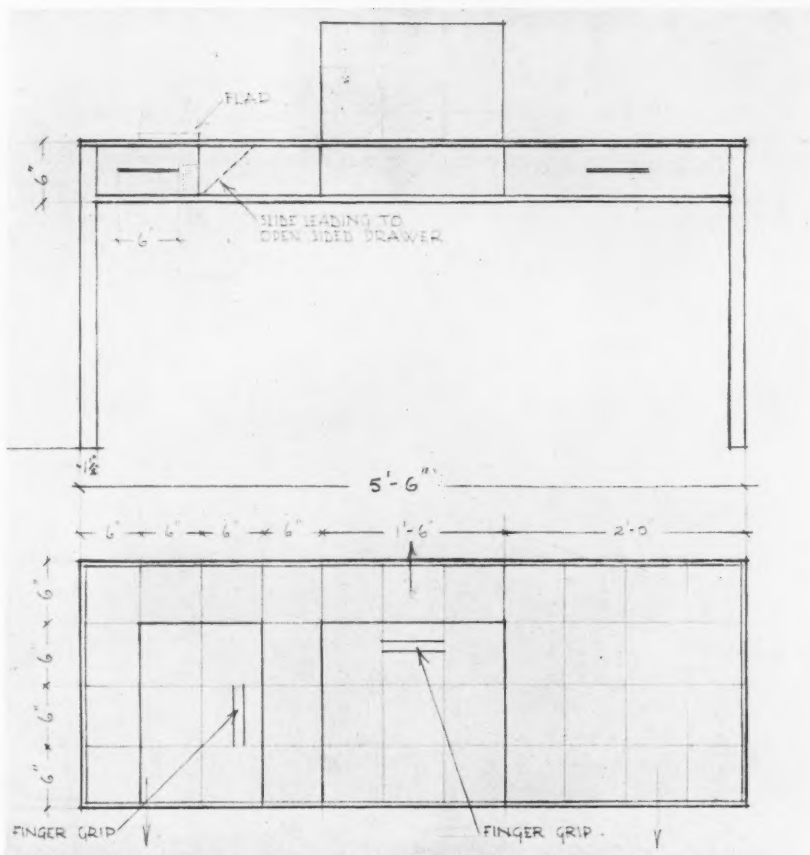
It is supplied in sheets, rods and tubes. A considerable space of time is required for the material to mature before it can be worked.

#### THERMO-SETTING MATERIALS

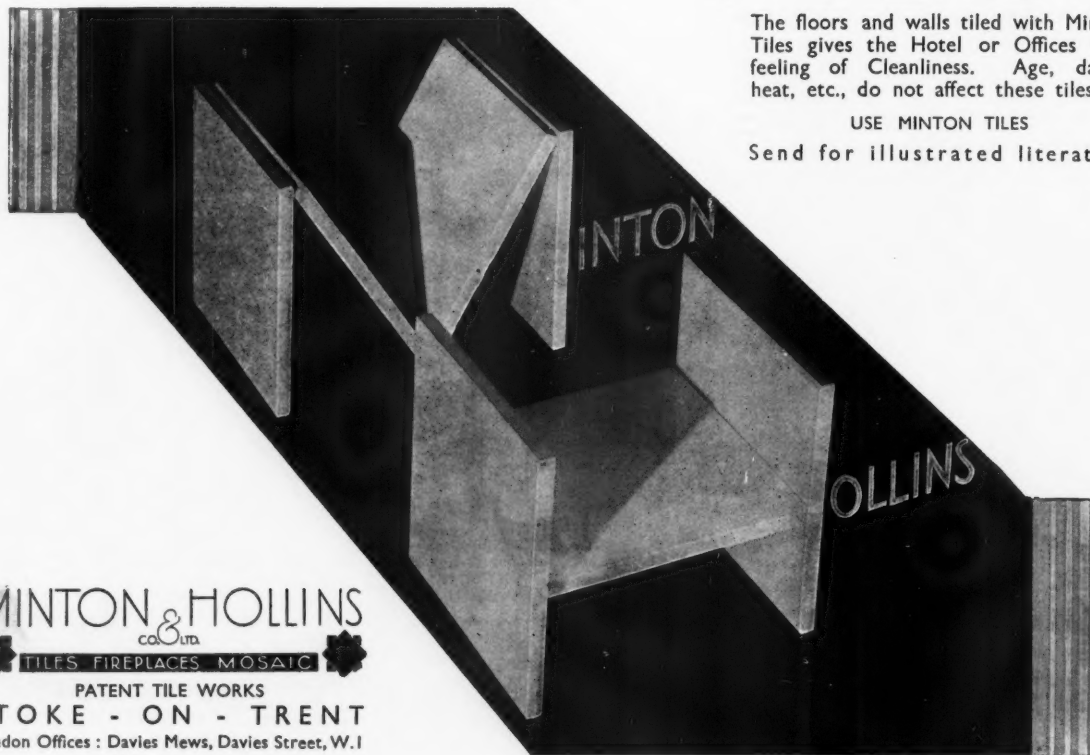
To return to the thermo-hardening or thermo-setting materials manufactured from the synthetic resinoids—Phenol-formaldehyde and Urea-formaldehyde. Up to the present greater progress has

Side and top elevations of a writing desk in Studio 3 B, Broadcasting House, London. A perspective sketch of this table is given on the next page.

Designer: Serge Chermayeff



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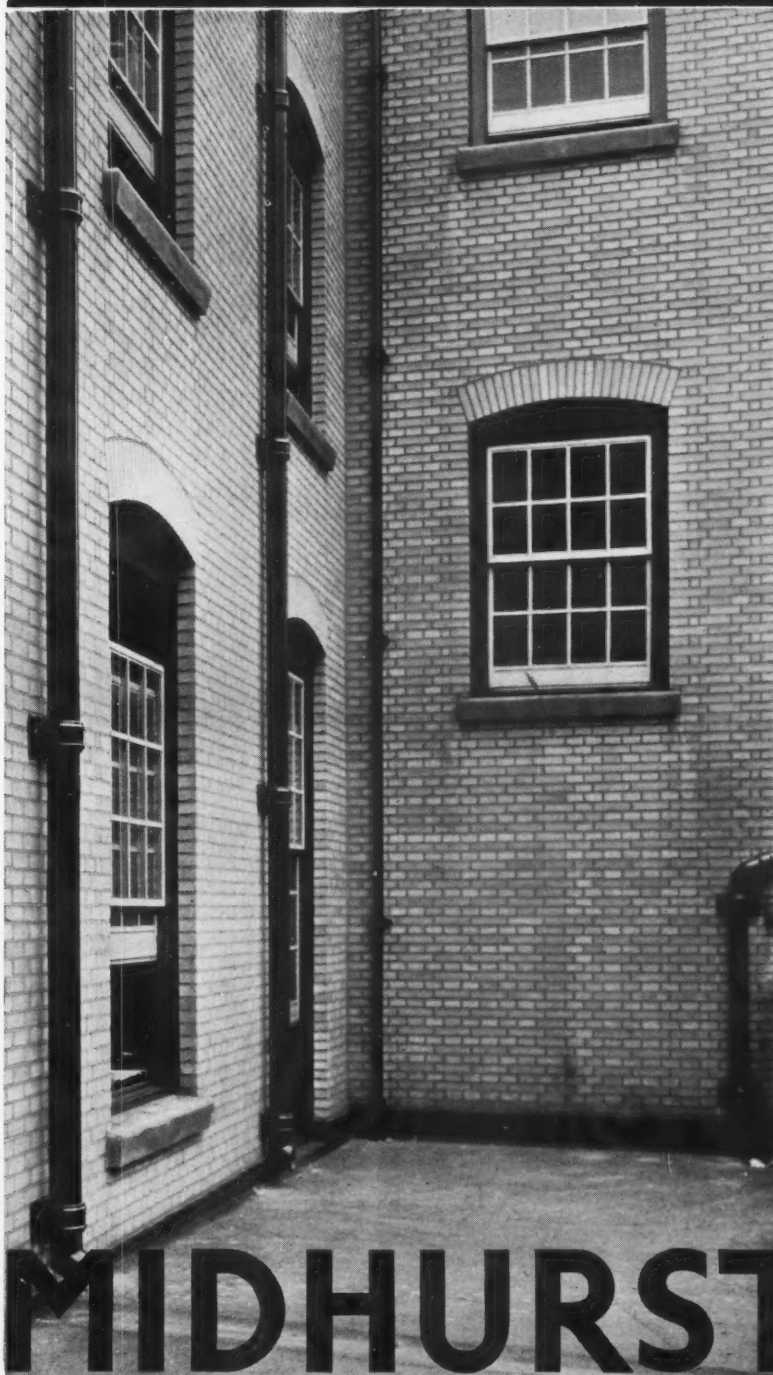
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#### Price

**£5 per 1,000**

IN CENTRAL LONDON (Elsewhere  
pro rata to transport cost).

*An untouched photograph showing  
Midhurst Whites as used in the  
new Headquarters of the National  
Society of Operative Printers.*

ARCHITECT: E. J. WILLIAMS, ESQ., F.R.I.B.A.  
13, New Street, Leicester.

BUILDERS: MESSRS. C. H.  
GIBSON, LTD., 509,  
London Road,  
Croydon.

# MIDHURST WHITES

THE MIDHURST BRICK COMPANY, LTD.  
Windsor House, Victoria St., London, S.W.1.  
Phone: VIC. 5551-2. Works: Midhurst, Sussex.



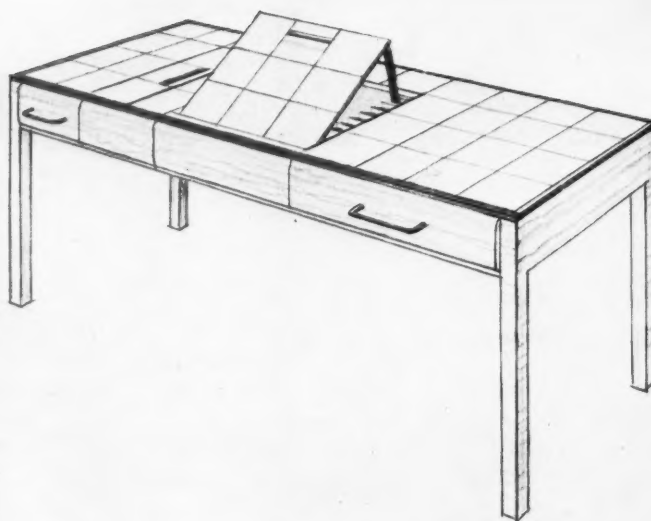
source advtg. 3A

been made in the point of range of coloration with the urea type, the phenol type being restricted to darker shades, because of the darker colour of the phenol resins. In both a filler is used with the synthetic powder, in the phenol wood meal (ground sawdust) dried and spirit-dyed or mixed with solid pigment; or macerated fabric to give toughness or asbestos powder to give extra heat tolerance.

In the urea type—it is not important here to distinguish between the urea and urea-thiourea technique—the filler is of wood sulphite.

Both types are but very slightly hygroscopic and therefore unliable to swell or twist; and both insensitive to most acids; are odourless and tasteless and have high dielectric strength.

The urea moulding process has been used with effect to provide an unbreakable or, more accurately, a much less easily breakable substance as a substitute for china and earthenware—picnic sets, beakers, and stackable cups being already familiar to the public. The pressure in phenol-moulding is about a ton, in urea about a ton and a quarter to the square inch. Moulds are sensibly worn in the process and their life is not a long one. Obviously in the design of moulds appreciation of this fact, which should be constantly borne in mind by designers, will lead to the simplification of forms. Phenol-plastic leaves the mould with a highly polished surface; the urea or urea-thiourea plastic is, however, susceptible of a more brilliant polish by buffing or other polishing processes.



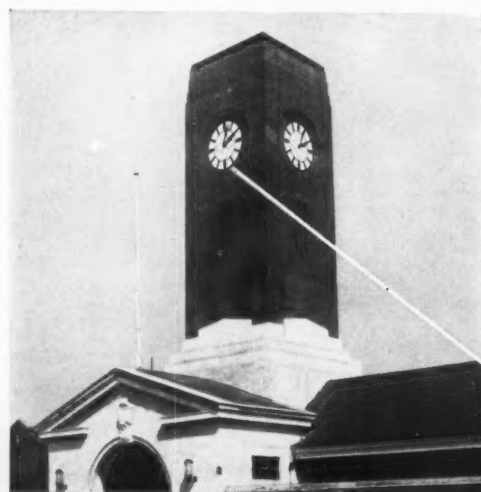
Perspective sketch of a writing desk in Studio 3 B, Broadcasting House, London. The top is divided into squares so that the microphone can be shifted about to suit the broadcaster's voice. The adjustable reading slope can be lowered flush with the top of the desk or raised to a steep angle. The framework is walnut and the top in Beetle. Designer: Serge Chermayeff.

The higher insulating properties of the phenol account for its extended use in the manufacture of electrical accessories. An interesting development of phenol moulding for these accessories is the ability to incorporate into the moulding itself and insulate within it the wires for transmission of electric current, so disposing of loose fabric insulated wires.

This development has possibilities in the designing of electric lamps by eliminating a great deal of tiresome and time-consuming screw connections.

#### RESIN-SATURATED PAPER

As to the laminated sheets of resin-saturated paper, compressed and heat-set



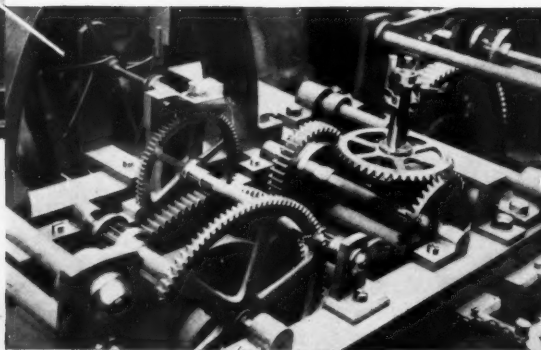
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Mr. A. E. Henson.

Contractors: Messrs. Glenn & Sons.  
Plasterer: Mr. Mark Smith.

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into coloured marble-hard moisture-resisting, unwarpage sheets, it has to be remembered that if they are attached to, say, ply-wood, the wood surfaces must be so sealed by varnish of the same nature as to prevent the warpage of the wood.

#### TEXTURES

Textures can be communicated to the upper lamina by engraving the plate of the platen. Wood veneer used as the top lamina can be wholly incorporated in the product. The laminated material can be supplied or made to specification in tube form and suggests many possibilities for decorative handling. The fire-resisting qualities and the hard unscratchable surface suggest uses for skirting boards, table tops for kitchen and laboratory and other surfaces where hard usage is desiderated—and it is likely that there are possibilities to be exploited in connection with steel-tubular furniture.

As to the area of sheets at present marketed, about 7 ins. by 3 ft., the limitations are merely those of the moment. A widening market will lead to the making of larger and more powerful presses.

#### COSTS

As the industry is in such a state of flux only general statements are possible; no guidance, for instance, can be given as to prices: but all information can be obtained from the Association of the British Plastic Moulding Trade Association, whose offices

are at 19-23, Ludgate Hill. These notes are only designed to serve as reminders that here are significant developments which may influence design well worth specific study by all connected directly or indirectly with building or the making of furniture. J.T.

#### NOTES & ANNOUNCEMENTS

In notes on the protection of iron and steel from rust and corrosion, issued by Messrs. G. A. Harvey, it is stated that rusting is a special case of corrosion depending upon the combined influences of moisture, oxygen and carbon dioxide, the process being accelerated by the presence of acidic substances in the atmosphere. The rate of corrosion or rusting of an iron or steel surface depends upon the conditions to which it is subjected and may vary very widely.

The anti-corrosive action of galvanized coatings depends entirely on their weather-resisting properties. When properly deposited, these coatings hermetically seal the surface and completely prevent the access of air to the underlying iron or steel. The practice of coating iron with zinc has, therefore, nothing to do with the relative electrolytic properties of zinc and iron, but is based on the fact that zinc itself is a highly weatherproof metal.

If the wish of those who have gathered together the present collection of things in Heal's Mansard Gallery (Tottenham Court


Road) is to show that furniture for the home is and should be eternally divorced from the jazz furnishing of the cinema, they have succeeded.

Here is a subtle collection of all sorts and kinds of white and "off-white" things—a "practical" fairy tale come true. There are, for example, white rugs, white sheepskin sofas, vellum covered furniture, white pots, pearl boxes, stone ware pots, and so on—all in variations of white, cream, beige and biscuit. A most interesting show which provides a perfectly quiet and harmonious background for everyday life.

In our May issue the wood block flooring for the Ace of Spades Club, Surbiton, was described as executed by Messrs. Hollis Bros. & Co., Ltd. We are now informed that Messrs. Hollis Bros. were responsible for the special Dance Floor, and that no wood block flooring has been installed.

The main feature of Messrs. Gaze's Chelsea Exhibit, 1933, consists of a summer house of unique design overlooking a garden with simple undulating lawn and massed flowers arranged in shades of blue, complemented with bright green and grey foliage.

The summer house is built in one corner of the site with a mass of evergreens as a background, and on each side a bank with grassy slopes and occasional outcrops of rock on which are growing masses of alpenes, semi-aquatics and ferns. The approach to the summer house is by a flight of stone steps leading to the floor level.



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Projecting from the summer house is an old oak balcony adorned with trailing flowers, and this leads to a winding path with occasional rock steps. Surrey Sandstone has been used for the rock work and the summer house. As we go to press the news arrived that Messrs. Gaze have won the highest award for formal gardens in the Chelsea Flower Show.

Among the artists, craftsmen and sub-contractors for the bathroom at the house of Mr. Edward James, No. 35, Wimpole Street, W.1, were Messrs. John R. Venning & Co., Ltd. (sanitary ware), Violute, Ltd. (neon tubes), India Rubber, Gutta Percha and Telegraph Works Co., Ltd. (Rubber flooring), James Clark and Son, Ltd. (glazing), Robinson King and British Challenge Glazing Co., Ltd. (alloy silvering), Chance Brothers & Co., Ltd. (reeded and  $\frac{1}{4}$  in. stippled cathedral glass), Cox & Co., Ltd. (metalwork), Pilkington Brothers, Ltd. (white, blue and pink polished plate glass).

The general contractors for the studios at Broadcasting House, Leeds, were Messrs. Wm. Irwin & Co., Ltd., who were also responsible for the reinforced concrete, glass, plumbing, joinery and cloak-room fittings. Among the artists, craftsmen and sub-contractors were the following: Messrs. F. Holdsworth (painting in studio), Trussed Concrete Steel Co., Ltd. (suspended acoustic ceiling), Rosser and Russell (central heating), Burrett and

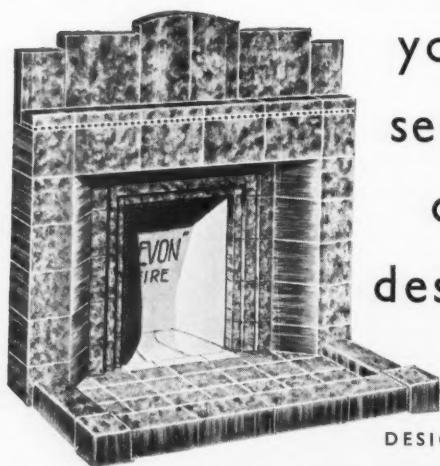
Walford (grates), Green and Smith, Ltd. (electric wiring), Troughton and Young, and Aeromet (electric light fixtures), The Merchant Trading Co., Ltd. (Donnacoma insulating board), Comyn Ching & Co., and Aeromet (door furniture), T. H. Wilson, and Crittall Manufacturing Co., Ltd. (casements), Cowling and Hobson (plaster and decorative plaster), Aeromet (metalwork), A. Andrews and Sons (tiling), Donald Brothers, Crossley and Sons (fabrics and carpets), Pel, Ltd. (nesting chairs), Aeromet (all other furniture), Synchronome Co. (clock movements), Geo. Dawson and Son (ventilation), Central Joinery Co., (flush doors), Constable Hart & Co., (approach roads).

The general contractors for "The Yews," Ridgeway, Fetcham, near Leatherhead, were Messrs. The Leatherhead Building Co., Ltd. Among the artists, craftsmen and sub-contractors were the following: Limmer and Trinidad Lake Asphalt Co. (asphalt), London Brick Co., Ltd. (Phorpres rustic facings), Stevens and Adams, Ltd. (wood block flooring), Crane, Ltd. (radiator), Nautilus Fire Co., Ltd. (stoves), Cross Brothers (electric wiring and electric light fixtures), The Leeds Fireclay Co., Ltd. (sanitary fittings), Yannedis & Co. (door furniture), W. James & Co., Ltd. (metal doors and windows), F. A. Norris & Co., Ltd. (roof ladder), Bryce White & Co., Ltd. (internal doors), Venesta, Ltd. (front entrance door).

Among the artists, craftsmen and sub-contractors for the new Gorilla House at the Zoological Gardens, Regent's Park, were the following: Christiansi and Nielsen, Ltd. (excavation, foundations, reinforced concrete, cell concrete and plaster), Ruberoid Co. (dampcourses), Pilkington & Co. (round glass lights), Williams and Williams, Ltd. (sliding doors and windows, door furniture, casements, sliding gates), Hall and Kay (special plant for heating, lighting and ventilation), Dennison Kett & Co. (rolling shutter, fireproof doors and iron staircase), Croggon & Co. (caging), J. and E. Hall (revolving structure).

The general contractors for St. Gabriel's Church, Blackburn, were Messrs. William Livesey and Sons, Ltd. Among the artists, craftsmen and sub-contractors were the following: British Reinforced Concrete Engineering Co., Ltd. (reinforced concrete), G. M. Callender & Co., Ltd. (Ledkore Dampcourses), Redpath Brown & Co., Ltd. (structural steel), Blockleys, Ltd. (tiles, dark brown and sandfaced), Pilkington Brothers, Ltd. (cathedral glass), G. Dawson and Sons, Ltd. (central heating), Thomas Blackshaw (electric wiring), W. Burden (electric light fixtures, metalwork and furniture), Best and Lloyd, Ltd. (electric light fixtures), Shanks & Co., Ltd. (sanitary fittings), Campbell and Mabbs (silver-plated door furniture), Russell Edwards, Ltd. (casements), Thompson and Capstick (marble).

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